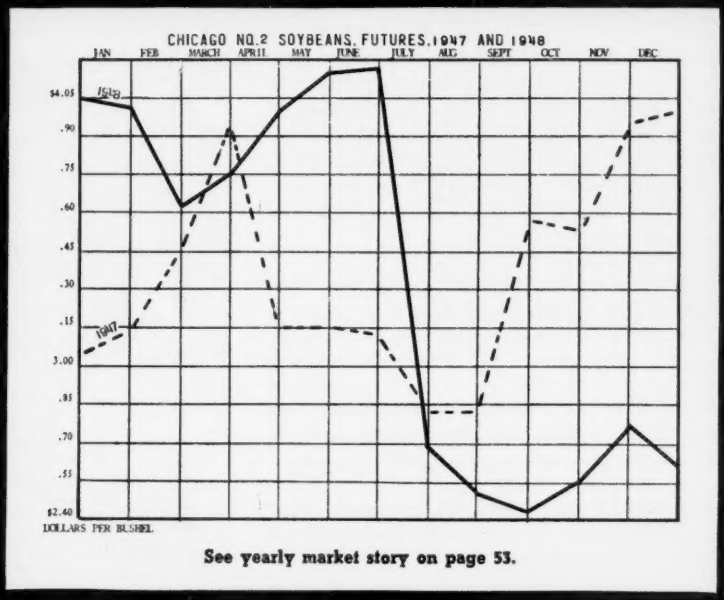
The Soybean Digest



See yearly market story on page 53.

Official Publication

AMERICAN SOYBEAN ASSOCIATION

VOLUME 9 • NUMBER 3

JANUARY • 1949

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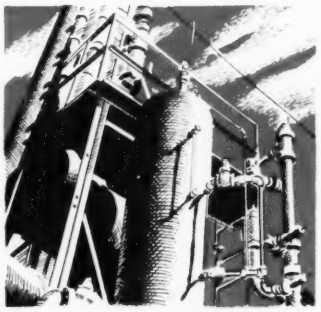

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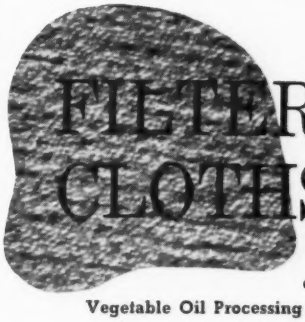

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EDITOR'S DESK

SOYBEANS ARE BASIC!

Under the federal price support program of the Production and Marketing Administration there has been a list of commodities classified as basic. This list includes those commodities which the Congress considered as of greatest importance, and control of which was believed to control most other commodities through feeding or other utilization. Since the original list was compiled in the formation of the early Triple-A programs there has been but one change—the addition of peanuts in 1941.

In the period which has intervened there have been material shifts in production in many areas. At the time the list was compiled soybeans were a minor crop. Now they compare well with the present list of basic crops, in dollar returns to the producer. In terms of contribution to national security they rank well toward the top of the list. Soybeans now supply 60 percent of the vegetable proteins and a little less than one half of the vegetable oil now produced in the U. S. Both are vital in time of war or peace—they are the two most short in the world's food commodities today.

The following rough table shows the dollar value of the 1948 production of the crops now on the basic crop list, according to compilations made in the *Soybean Digest* office. Soybeans are also shown:

Corn	$4.4 billion
Wheat	$2.7 billion
Cotton, Cottonseed	$2.7 billion
Tobacco	$713 million
Soybeans	$519 *million*
Peanuts	$244 million
Rice	$189 million

The suggestion has been made to the chairman of the agricultural committee of the House of Representatives, the Under-Secretary of Agriculture, and to other prominent government officials, that soybeans should be included in the basic commodity list when the agricultural program is written during this session of Congress. It has approval of many officials in the Department of Agriculture. Soybeans can and will be included as a basic commodity—if enough growers of soybeans make their desires known to their representatives in Congress. It will not be done unless you—the growers of soybeans—make your wishes known. No other group or individual will be responsible for soybean interests—we must do the job ourselves.

To place soybeans on the basic commodity list will mean that they will be supported on the same price basis as the other basic crops—whether that turns out to be 90 percent of parity, or a sliding scale between 60 percent and 90 percent. Soybeans are now on the Steagall price support list. THEY SHOULD BE PLACED ON THE BASIC COMMODITY LIST in the current session of Congress.

SHOULD ACT . . . AND FAST!

The politics of Europe are inseparably tied to supplies of food. If we will provide sufficient supplies of nutritious food to enable men and women to return to normal work, we can forestall Communism. If we do not provide the protein and fat which is necessary to sustain life and enable work, we will lose. Communistic promises, even though not fulfilled, look inviting. Europe has sufficient supplies of carbohydrates and starches—she does not need potatoes or wheat—she needs cooking fats, table spreads, and work-sustaining proteins.

Soybeans are the answer to that need. They supply both protein and fat in quantity—and cheaper than any other possible source. We have 20 million bushels more soybeans than in any previous year. Europe has the facilities for processing them into food products. The Department of Agriculture has recommended allocations of soybeans for export.

The Department of Commerce has refused to honor those recommendations except in token quantities. On Secretary of Commerce Sawyer falls the responsibility for prolonging European reconstruction problems because he will not approve allocations of materials available here, needed there.

While there is still time he should allocate American soybeans to European countries. They are the world's cheapest source of edible oil today.

SOYBEAN OIL IS LOSING MARGARINE MARKET

Soybean oil stands second in quantity among oils used in margarine the first three quarters of 1948. This of course is not news. Soybean oil has been second on the list of margarine oils for a number of years. The news is that the quantity gap between soybean oil and cottonseed oil, in first place, is widening.

Some years during the war soybeans supplied almost as much oil to the margarine industry as did cottonseed. But the first 9 months of last year soybean oil constituted only 35.5 percent of the oils going into margarine. Cottonseed furnished 59.8 percent.

Part of the reason for the shift away from soybean oil in the margarine market is the greater availability of all vegetable oils. Buyers are in position to be more choosy. So while soybean oil is finding a wider field among industrial users, it is losing ground relatively as an ingredient of a higher-value product, margarine.

This development gives point to the need for pushing ahead with basic research on the cause and cure of soybean oil reversion, which is its chief handicap with margarine. We have mentioned this need here many times before. If soybean oil is to compete on equal terms in the high-value field its weaknesses need to be known and corrected. Such action cannot wait.

The high-value markets are the ones that will support a good price for soybean oil—and soybeans. Once lost, they will be much more difficult to regain.

EARLY ACTION SEEN ON MARGARINE TAX REPEAL

As this issue goes to press the deluge of bills designed to remove the federal taxes and restrictions on margarine has gone into the hopper in both the House of Representatives and the Senate. Early repeal has been called for by President Truman, and there is every reason to believe that with sustained interest on the part of consumers of margarine and the producers of cottonseed oil and soybean oil the job can be done this time.

H.R. No. 3 is the Poage Bill to remove federal taxes and restrictions. It is preceded on the House calendar only by the bill to increase the salary of the president and the bill to provide housing for the vice president of the United States. Its assignment of a low HR number almost assures early attention and action.

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ACTIVITIES OF YOUR ASSOCIATION

ASA PROGRAM CALLS FOR YOUR SUPPORT

A year ago a personal appeal went out from the executive offices of the American Soybean Association to every member. Your officers asked for help in building an organization with the strength to meet the terrific challenge of a fast-changing world—where only the groups that are adaptable and virile and well-financed can survive.

Members were asked to sign up new members. They were also asked for cold cash, in not-too-modest amounts.

The response was good. It provided the funds needed to allow the Association program to go forward. Your directors and committees and employees went to work.

In 1948 the Association was able to come a long way. Field work was set up in limited areas in Illinois and Ohio where growers contributed 1/5c per bushel from the 1948 soybean harvest.

Growth has been rapid—but with accompanying growing pains. All fronts cry for action in behalf of the soybean grower and the industry—NOW. With the 81st Congress coming into being there are many legislative contacts to be made before its slates are made up. The Association finance program is still not much past the pilot-plant stage. Needs outrun finances just as they did a year ago.

So once again, the day before Christmas, President Ersel Walley addressed a letter to the members. He asked them to secure more new members. And he asked them for funds based on the increased returns in the way of better soybean prices the Association has already secured for them.

"Never before in history has there been so great a need for a strong, virile organization to represent the growers of soybeans in America," stated President Walley. "Soybeans will be included on the basic commodity list under the Federal price support program if we can convince enough members of Congress that it should be done. There is good possibility of further allocations of 1948 crop beans for export—and this is highly important as a means of securing this market for our beans through a period of years.

"The export allocations secured in September and October probably brought you 20c to 40c per bushel more on your 1948 crop of beans. Those allocations came primarily as a result of the work of the American Soybean Association. The 2.9-million-bushel allocation announced earlier this week can be attributed to a recent call our secretary made on Secretary of Commerce Sawyer in Washington. There are scores of other promotional and legislative jobs which need doing *now*.

"To represent you as a soybean producer or handler . . . requires employment of personnel to make contacts, draft plans, do legislative work. We need your help. If you received 20c to 40c per bushel more for your soybeans due to our activities in your behalf, would you contribute 5c or 10c per bushel of that amount toward continued efforts along the same line? Or even 1c per bushel?"

At the same time an appeal went out from the executive office of the Association to all elevator managers in leading soybean growing areas. They were asked to match the 1/5c-per-bushel contributions from the areas where the program is in effect on the bushelage their elevators handled.

As the *Soybean Digest* went to press returns from the two appeals were beginning to come in. If there is adequate response from the two groups in addition to the funds coming from the finance program the Association should be able to broaden the scope of its 1949 activities far more than would be otherwise possible.

1949 CONVENTION

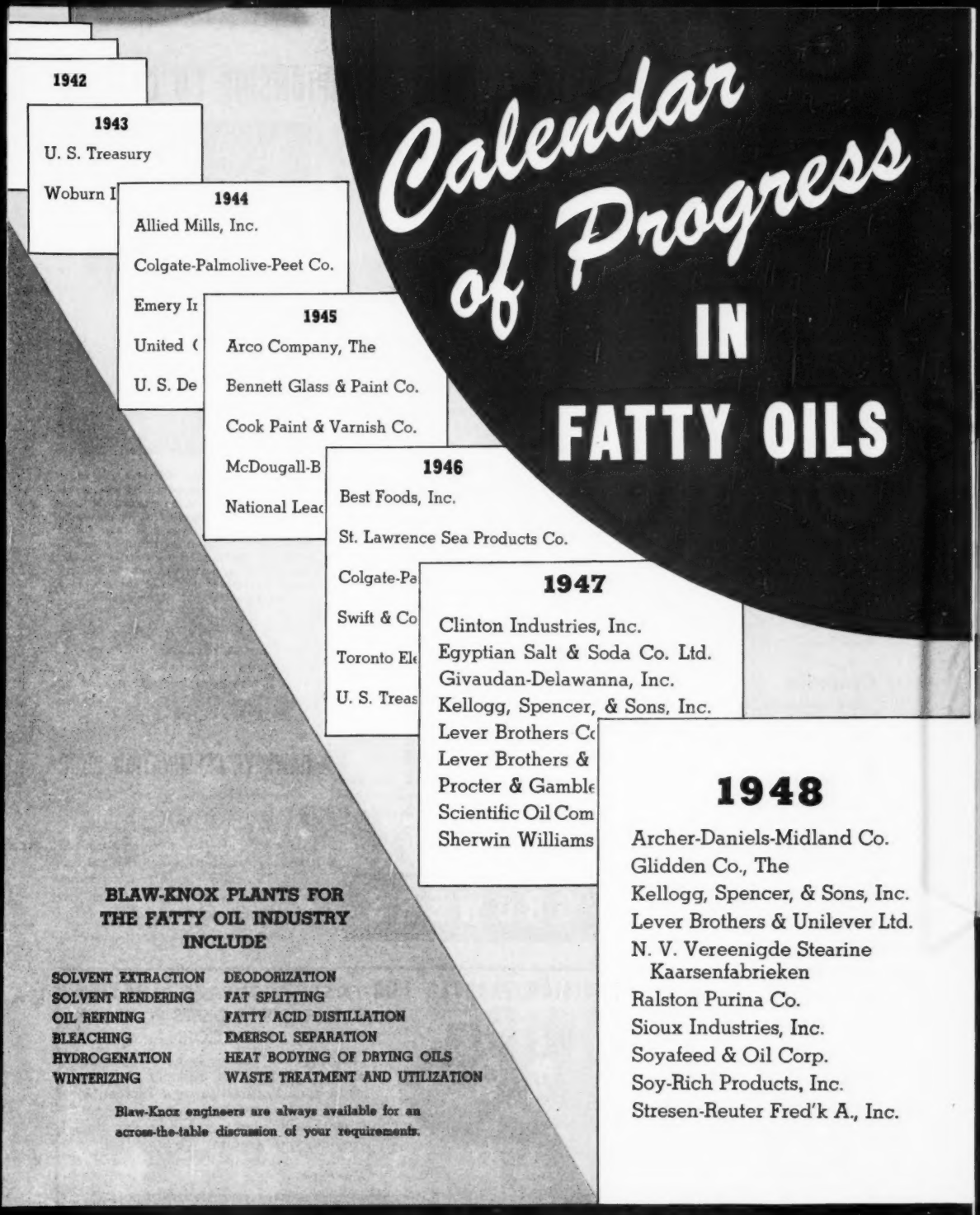
The state of Minnesota will be host to the American Soybean Association at its 29th annual convention. Hotel Nicollet in Minneapolis will be convention headquarters and the dates are September 6, 7 and 8, 1949.

Action setting the convention dates and the place was taken at the December 1 meeting of the ASA board of directors.

Minnesota, host to the national soybean convention for the first time, has been coming up fast in soybean production, and is now in a see-saw race with Missouri for

"THIS CROP NEEDS WATER"

You'll get to know the little guy in the corner better as the months go by. He's a big booster for the Association program, but he ought to have a name. Please help him out.



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fifth place among the nation's top-producing soybean states. In 1947 Minnesota grew 13.8 million bushels compared with Missouri's 9.9 million bushels. But preliminary reports for 1948 indicate that Missouri's 1948 crop is slightly larger, with 14.7 million bushels compared with 14.6 million bushels for Minnesota.

Association director from Minnesota is John W. Evans, Montevideo.

SHOULD BE BASIC

Much water has gone over the dam since the basic commodity list was made up before the war. Soybean production has more than doubled. Instead of a minor crop, soybeans now compare in importance with corn, wheat and cotton, included on the basic list.

As a result of the increased soybean production we have changed from a fat-importing nation to one that is self-sufficient in fats and oils. This position is vital to national security and should be maintained, ASA officials believe.

For this reason, the present soybean acreage must be continued. It will be continued only if soybean production is profitable. Congress can provide considerable insurance of this by recognizing the present national importance of soybeans through placing them on the basic commodity list.

Association officials are calling the need for this action to the attention of Congressional leaders.

Correction

In a report in our November issue on the various moving pictures available for loan through the American Soybean Association a mistake was made in the description of the *Soybean Story*, produced by Allis-Chalmers Co.

It was stated in the account that the film was produced by Allis-Chalmers in cooperation with J. C. Hackleman, extension agronomist of the University of Illinois. Actually, Dr. W. L. Burlison, head of the department of agronomy at the University of Illinois, cooperated with the Allis-Chalmers people in production of the film. This mistake is regretted.

INTERNATIONAL CHAMPIONSHIP TO CANADA

"The Red Coats are Coming!" That's what soybean growers in the United States may have told each other when they learned that Canadian farmers were entering samples of their beans in the International Grain and Hay show at Chicago's stock yards.

But the threat of foreign competition didn't bother big, soft-voiced Harvey L. (The Duke) Stiegelmeier of Normal, Ill. He had won the show's soybean championship for the last 2 years with his Lincoln variety, and he was sure he would win again.

However, this year he grew beans of the Hawkeye variety from certified seed, up to a total of 40 acres on his McLean County farm.

In the international competition, his beans didn't do so well. They took second place, giving him the reserve award, while the top prize went to William R. Beattie of Staples, Ontario, Canada, a first-time winner who grew the good old Lincoln beans.

While Stiegelmeier had been warned that "the Red Coats were coming," he didn't believe, he says, that the Canadians could win with the same variety that had given him the purple ribbon and the Pillsbury trophy for the past 2 years. But that, he concludes, is what makes international competition worth while.

His efforts were not without further reward. The first payoff for having raised the best soybeans in the United States came in the form of the Philip W. Pillsbury national soybean trophy, which he received at a dinner in his honor December 1 at the Stock Yard's famous Saddle and Sirloin Club.

And here's the second payoff, according to "Duke" Stiegelmeier. His comely 22-year-old daughter, Phyllis, talked him into growing the Hawkeye variety, and "did most of the work."

Harvey L. Stiegelmeier of Normal, Ill., whose soybeans of the Hawkeye variety won the reserve championship at the International Grain and hay show in Chicago, received the annual Philip W. Pillsbury trophy for best United States soybeans, when the first prize went to William R. Beattie of Staples, Ontario, Canada. Stiegelmeier previously had won the Pillsbury award in 1946 and 1947, and also the grand championship at the Chicago show.

Phyllis tells it this way: "Seems like you can't lose when you plant certified seed. The 1,500 bushels of beans we harvested were worth $6 a bushel as seed, and that adds up to a tidy sum in anyone's bank account," to which her dad heartily agreed.

GROWERS

HAWKEYE GERMINATION POOR

Poor germination may cause a shortage of Hawkeye seed in some areas, information from the Iowa Seed Testing Laboratory at Ames would indicate. Fifty percent of the Hawkeye seed that has been tested to date at the Laboratory will not pass certification requirements, according to Dr. D. Isley, head of the seed laboratory.

The cause of poor germination may be

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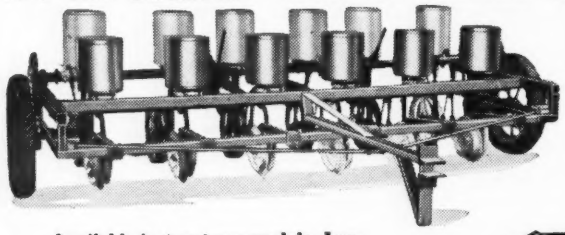

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**Consumption 1948 and Industrial Surveys, Inc., data*

National Association of Margarine Manufacturers

Munsey Building **Washington 4, D.C.**

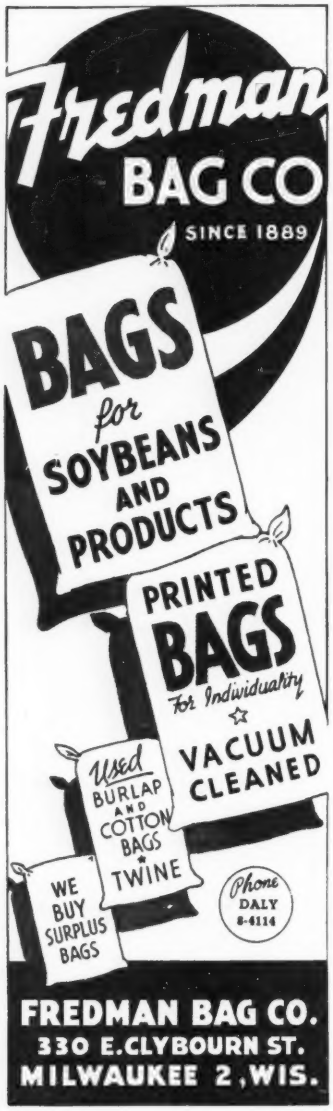
due to injury during threshing, Iowa Agricultural Experiment Station agronomists believe. They point out that weather was very dry at the time Hawkeyes were combined in Iowa, which resulted in many damaged seed-coats. They say that Hawkeye seed with perfect coats has been germinating 90 percent or better, but seed with damaged coats is germinating only 50 to 80 percent.

Damage may not be confined to Hawkeyes —other varieties grown in Iowa are reported to be low in germination.

Germination in Ohio is apparently much better. Most samples have been germinating 90 to 95 percent, according to the Ohio Seed Improvement Association. One hundred thousand bushels are available for seed in Ohio and it is estimated that from 100,000 to 125,000 bushels will be planted. There is no surplus of Hawkeye seed for out-of-state sale. Seed is selling in Ohio at $5.50 per bushel.

Up to 10,000 acres of Hawkeyes may be planted in 1949 in the extreme south and southwestern areas of Wisconsin where they are recommended, says Geo. M. Briggs, extension agronomist of the University of Wisconsin. Seed was increased in four counties in 1948 and enough should be available for planting approximately the above acreage, according to Dr. Briggs.

Hawkeye seed germination has also been well above 90 percent in Indiana, according to K. E. Beeson, secretary-treasurer of the Indiana Corn Growers Association. He estimates that from 100,000 to 150,000 acres of Hawkeyes will be grown in Indiana in 1949. Growers of foundation seed stock have agreed to sell at not over $1.50 above the price of No. 2 soybeans in Chicago.



Tests Open to All

Although state and federal crop breeders are responsible for originating many of the varieties of soybeans now favored by growers, the race is wide open to commercial breeders and to farmers who have the skill—or the luck—to produce a new variety. The Soybean Variety Committee will welcome worthy entries for testing in the uniform nursery trials, in which a new variety has an opportunity to prove its merits, states U. S. Department of Agriculture.

The uniform soybean nursery trials are designed primarily for comparison plantings in typical soybean growing areas under supervision of the Bureau of Plant Industry, Soils, and Agricultural Engineering cooperating with state and private seed specialists.

The Soybean Variety Committee is composed of two representatives of the U. S. Department of Agriculture, one representative of the state experiment stations, and two representatives of the American Seed Trade Association. Its function is to advise the administrators of the Federal Seed Act with respect to names and characteristics of soybean varieties. Seed may be submitted to W. A. Davidson, at Beltsville, Md., who is a member of the committee, and who is in charge of administering the Federal Seed Act. He will distribute the seed to nurseries for test plantings.

The committee recommends that a breeder submit with the seed a statement of the origin and characteristics of the variety. The Department advises against submitting samples and this information unless the characteristics of the new variety are fixed and the seed is ready for distribution.

Ontario Production

Acreage and production of soybeans increased by almost half in Ontario this year compared with 1947, reports the Ontario Department of Agriculture.

Total 1948 production was 1,683,000 bushels compared with 1,110,000 last year, according to the department's figures. Acreage was 94,000 in 1948, and 61,000 in 1947.

Average per acre yield in Ontario in 1948 was slightly less than in 1947, 17.9 bushels as compared with 18.2.

Most of the soybean production in 1948 was in southern Ontario as in the past, 1,617,735 bushels. Other production in the province: western 43,530 bushels; central 18,220 bushels; eastern 3,515 bushels.

Louisiana Crop Short

Central Louisiana soybean production, normally second only to cotton as a moneymaker, was so small last year that farmers will have to buy seed for the 1949 planting, says *South Atlantic Seedsman*.

W. T. Nolan of Hamburg, La., one of the South's leading seedsmen, said an infestation of soybean caterpillars was responsible, and that farmers started their fight against the caterpillars too late.

In some years soybeans have brought more cash to farmers in the area than cotton.

Two Crops Pay Off

A two-crop system that produced 69 bushels of barley per acre and 20 bushels of soybeans per acre from a 40-acre field in 1948 was followed by E. D. Shepherd of Cowley County, Kans., reports the *Kansas City Weekly Star*.

Shepherd says the field is sometimes flooded by Walnut River and the land is so rich that tests run on its soil by Kansas State College showed it needed no lime, phosphate, potash or nitrogen.

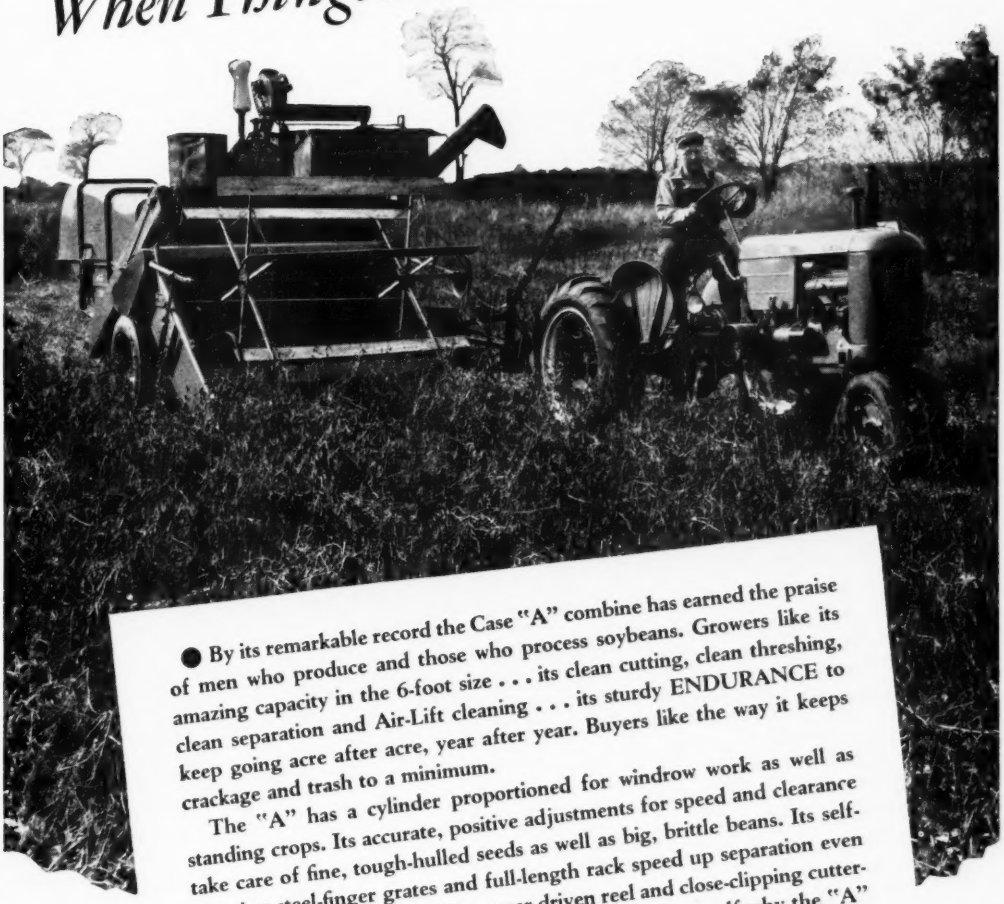
The field hasn't been plowed in five years. Formerly he prepared the land with a chisel-type cultivator. But last year he bought a heavy field cultivator with which he can penetrate the ground much deeper.

—Photo courtesy Kansas City Weekly Star

E. D. Shepherd of Cowley County, Kans., examines a field of soybeans that made 20 bushels per acre following a 69-bushel barley crop the same season.

Tops for Soys . . .

When Things Are Good or Bad

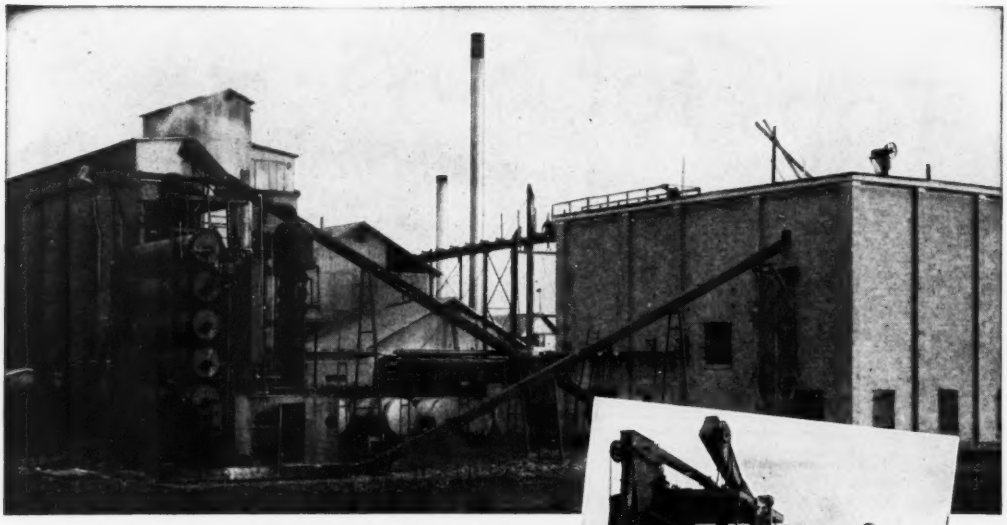


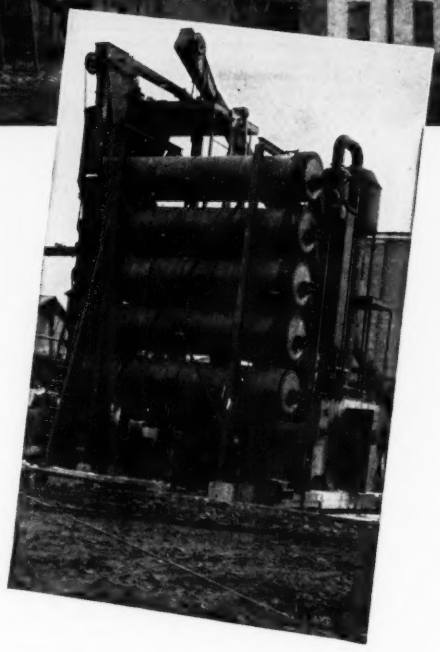
● By its remarkable record the Case "A" combine has earned the praise of men who produce and those who process soybeans. Growers like its amazing capacity in the 6-foot size . . . its clean cutting, clean threshing, clean separation and Air-Lift cleaning . . . its sturdy ENDURANCE to keep going acre after acre, year after year. Buyers like the way it keeps crackage and trash to a minimum.

The "A" has a cylinder proportioned for windrow work as well as standing crops. Its accurate, positive adjustments for speed and clearance take care of fine, tough-hulled seeds as well as big, brittle beans. Its self-cleaning steel-finger grates and full-length rack speed up separation even with wet or weedy material. Its power-driven reel and close-clipping cutter-bar do their bit to save every possible pod. See for yourself why the "A" ranks so high with growers who know combines best. See your Case dealer. J. I. Case Co., Racine, Wis.

CASE

HARVEST MACHINERY FOR 106 YEARS





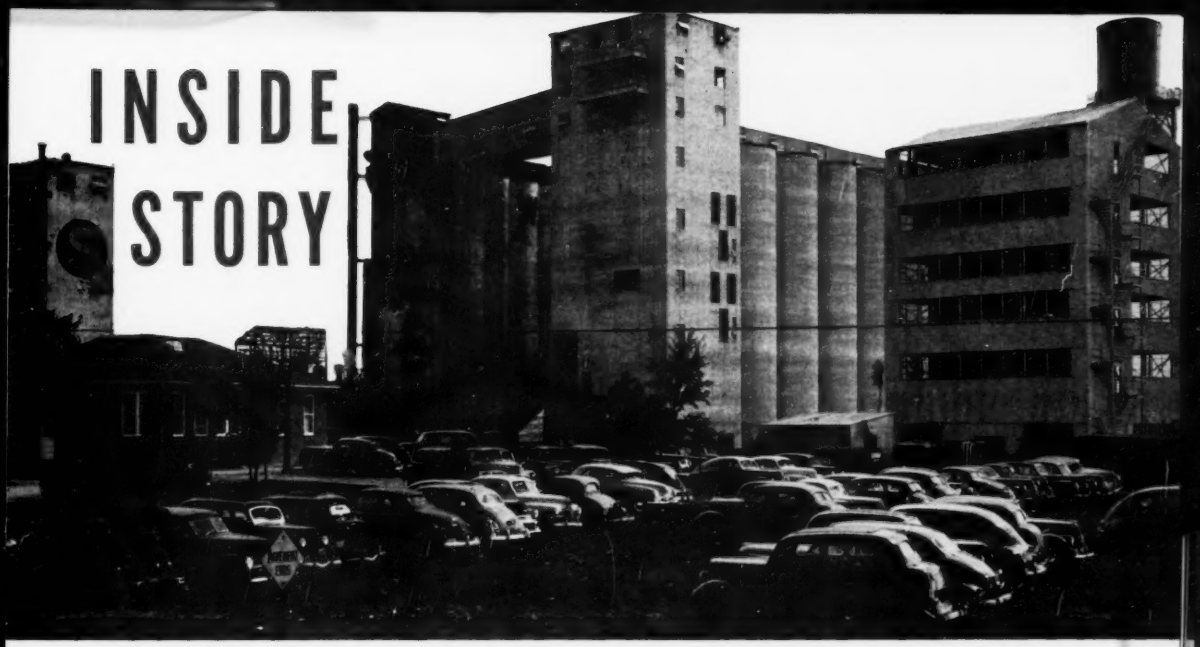
Another
ANDERSON SOLVENT EXTRACTION UNIT
Nearing Completion

Another Anderson Solvent Extraction Unit will be in operation at Henderson, Kentucky for the Ohio Valley Soybean Co-operative, Inc. This 80 ton installation is unique, in that it supplements this company's present mechanical press equipment. More than that, the installation includes an Anderson Pressure Toaster to give the meal that Anderson Nut Like Flavor. This is the second installation to include in its equipment an Anderson Pressure Toaster.

The continual parade of new Anderson Solvent Extraction Unit installations is indicative of the acceptance of prefabricated, out-in-the-open design, one man, remote control, solvent extraction units. You will be interested in other units now under construction, which will be shown to you month by month. In the meantime, let us give you factual information on Anderson Solvent Extraction Units. Write today.

THE V. D. ANDERSON COMPANY
1976 WEST 96th STREET • CLEVELAND 2, OHIO

ANDERSON EXPELLERS AND SOLVENT EXTRACTION EQUIPMENT



Swift & Co. plant now nearing completion at Champaign, Ill., will be among the nation's best equipped solvent extraction mills.

of the SOYBEAN

• What goes on inside a soybean processing plant is here graphically described by the general superintendent of Swift & Co. oil mills. From his talk at the Remington, Ind., soybean show.

By L. C. MILLER

THAT YOU producers here this afternoon believe in soybeans and their growth is amply proved by the records of production in this area over the past few years, and that you know how to produce good beans is demonstrated by the splendid samples on exhibition here today. More important, however, is your obvious desire to make still further progress in improving yields and the quality of the beans which you grow. We of Swift & Co. are sure that we can look forward to more and better soybeans as a result of your efforts.

Swift & Co., as processors of soybeans and marketers of soybean products are vitally interested in soybeans, or perhaps more particularly the inside of the soybeans which you produce. If we are to succeed, we must have not only a large dependable source of supply for the soybeans which we require to keep our facilities going, but we must also have good quality soybeans.

Just as the value of livestock is governed by what packers can get for the meat and by-products, so what we can afford to pay for soybeans is governed by what we can get for the oil and meal we can extract from them.

The soybean has a long history and many, many romantic stories have been written about its qualities and the varied uses of its component parts. Some of these uses are horn buttons, steering wheels, plastics in various forms, paper coatings, and so forth. However, the "bread and butter" of the soybean business at present is food, either for human or animal consumption. Swift & Co.'s soybean products go entirely to food of some kind. The very composition of the soybean makes it inevitable that it should play an important role in the business of food, so let's look inside the bean and see what it is composed of.

After we remove the thin fibrous hull encasing each bean and which accounts for about 8% of its weight, we find a mass whose principle components are protein, oil, and water. Of course, there are other things such as phosphatides, but let's confine our investigation to those which are most important, namely oil and protein mass. It is the job of the oil miller to separate the oil from the protein mass in which it is dispersed and do it not only thoroughly but in such a manner that the resulting products—crude oil and protein feed—are of desirable quality for those who need them.

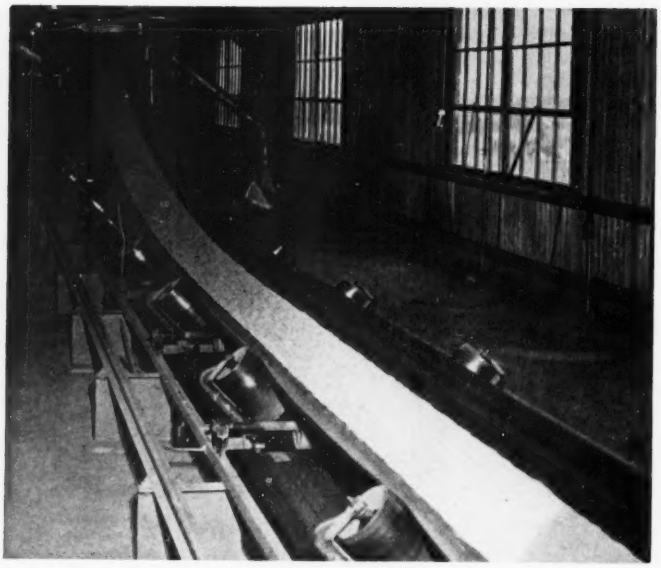
Swift & Co. have worked soybeans through all sorts of equipment such as hydraulic presses, screw presses and solvent extraction. To the uninformed, it might appear that the oil miller's job is a simple one, but let me assure you it not only requires a certain amount of know-how, but a tremendous amount of equipment and investment. To set up only a very modest extraction plant requires a large investment, and the more modern the plant, the higher the cost. A moderate sized mill would cost about 2 million dollars today.

Great interest has centered around solvent extraction of soybeans, so let's look at a solvent extraction plant and see just what is required to remove oil from the protein mass which composes the inside of a soybean.

Soybeans as raw material must be received and be available as required by the extraction plant, so we will start with—

1. Receiving and Storing:

Due to the rapidity with which you soybean producers harvest the bean crop, special facilities must be provided at the mill to handle large quantities of beans received both by truck and rail. Thus, no matter how you choose to deliver your crop, facilities are provided to give you a cash market where your beans can be delivered with the minimum delay and inconvenience to you. To do this, provisions for rapid weighing, sampling, and grading are provided at each of our mills. Truck dumpers that will unload a truck of beans in a few minutes are provided so that your trucks may make more trips per day. Power shovels are used to unload railroad cars rapidly as it is also



Soybeans, after arriving at the processing plant by railroad or truck, are here being elevated by a conveyor belt to the top of huge storage bins at the Frankfort, Ind., plant of Swift & Co.

important to turn grain cars rapidly not only to return for more beans, but to handle other agricultural products which so urgently need transportation during the heavy harvest season.

With all this rapid unloading equipment, high speed high capacity conveyors are required to move the beans from unloading pits to the storage bins proper, and obviously these bins must be large enough to provide for the surge of beans available during the harvest, and provide for their safe storage until months later when they fulfill their destiny and become oil and proteins in suitable forms to be used by our customers. To build such a storage is quite a project in itself requiring much planning and a large capital expenditure.

An elevator such as those at Frankfort requires approximately 17,000 tons of concrete and 500 tons of reinforcing steel. About 40 percent of this material is below ground and not seen from the outside. With this in mind, you can readily appreciate the magnitude of the job of providing soybean hotels, which are necessary to hold the crop until processed. In a modern elevator, special attention is given to ventilation and dust control. Beans are stored according to quality and moisture content, with each storage bin equipped with a series of thermo couples to measure the temperature of beans in storage. This step is necessary as some beans arrive damp or green along with foreign material which may cause heating and spoilage of beans. By continuous following of temperatures throughout the storage bins, any sudden change can be detected and corrective steps be taken to stop further heating.

Before soybeans can be processed, they must be cleaned to remove dust, dirt, empty pods, stones, weeds, seeds, metals, and other foreign material which interfere in the process. The presence of rocks and tramp iron may cause serious damage to processing equipment. Cleaning is accomplished by aspiration with air, shaker screens, magnetic separators, etc.

After cleaning comes—

2. Solvent Extraction:

In solvent extracting, the beans are dried to about 10-11 percent moisture and carefully cracked into about 10 pieces with strong emphasis on uniformity of crack and the absence of fines. After desired heat and moisture are obtained, the cracked beans are flaked through heavy flaking rolls which roll the warm particles into thin flakes about 6-8 thousandths of an inch thickness. These flakes are carefully conveyed, to avoid breakage and resultant fines, into the extractor where they are washed with a solvent, usually one of the hydrocarbons such as hexane. Hexane is highly flammable, and vapors are explosive even in low concentration.

It is obvious that a plant handling such a material should be carefully designed and operated to minimize hazards and accidents. In Swift & Co. solvent extraction plants, all motors, electric wiring, switches, lights, and so forth, are explosion-proof.

The buildings are forced-draft ventilated and constructed with grating floors to eliminate pockets where vapor could collect. Continuous "sniffers" are installed to constantly analyze the air in various portions of the building. They automatically set off an alarm if the quantity of vapor in air reaches a level well below the lower danger limit.

A number of different types of equipment are employed to solvent wash oil from oil-bearing materials. But whether a basket type, tube type, counter current tower type, or rotary type extractor is used, the extraction plant must perform the following jobs: 1. Remove the oil from the protein material; 2. remove the solvent from the oil; 3. remove the solvent from the meal; 4. run continuously and satisfactorily for a long period of time; and 5. operate safely. Various manufacturers have different ideas as to how these jobs can be accomplished, and consequently various types of equipment are employed.

The Process

The process is one of diffusion and separation, but the equipment to handle the products during the process requires special designs and solution of many mechanical problems. It is the solving of these problems which gives the most difficulty. For example, the dust problem and fines carried over into the miscella—a solution of oil in solvent—or condensers; conveying of spent flakes, which have a tendency to adhere to conveyor flights and boxes, particularly if excess moisture is present; keeping feeders open, and the synchronization of all equipment require continued attention.

The basket type of extraction is in greatest usage at present, so let's examine this type in our discussion:

A basket type of extractor consists of a number of metal baskets (with a wire screen bottom) on an endless chain in a vertical tower much like a bucket elevator running at slow speed with large baskets. The hot rolled flakes are fed into the baskets at the top on the downstream side and washed with ½ miscella pumped from upstream side of the extraction tower (½ miscella is solvent which is used in the final wash of the baskets on the upstream side and contains some extracted soybean oil). This ½ miscella picks up more oil as it washes through the flakes and drips through to the baskets below.

The miscella, after percolating through the bottom basket on the downstream side of the extractor, collects in the sump at the bottom and is known as full miscella. During the upward travel of the baskets on the other side of the extractor, they are showered with fresh solvent, which percolates down through the baskets to the ½ miscella sump.

The flakes at the top point of their travel have most of their oil removed and are dumped into what is known as a spent flake hopper. The flakes are withdrawn from the extractor by screw conveyors and discharged into the meal conditioners where the process of removing solvent from the spent flakes is carried out. This is done by conveying the flakes through heated tubes where they are heated, turned over many times, and washed with superheated steam to strip the flakes

free of solvent. The solvent driven off during this process is recovered by a condensing system and returned to a supply tank for re-use.

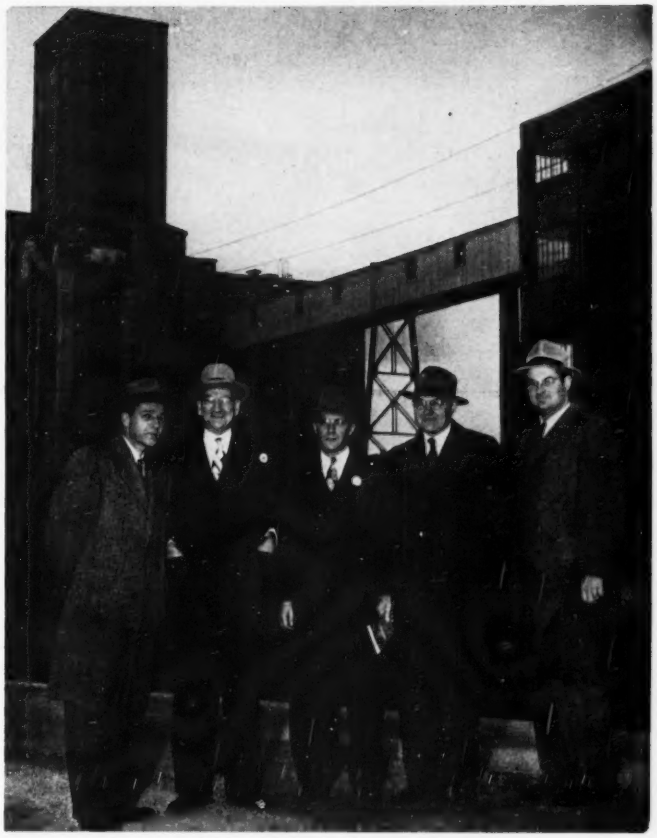
Now to go back to the full miscella. This is pumped from the sump in the bottom of the extractor through a filter (to remove fine solids) and into evaporators where considerable solvent is boiled off, and then into a vacuum stripper where the final solvent removal takes place. Oil pumped from the stripper is checked for quality, cooled, and pumped to storage to await shipment. Here again solvent vapor is condensed and returned to the solvent supply tank. During the cycle, small quantities of solvent are lost through minute leaks, or out through the vent system. While this loss is small percentage wise, it amounts to a considerable amount of money over a period of time, and solvent cost is an important consideration.

The conditioned meal (meal with the oil and solvent removed) is further treated by toasting in steam heated equipment to produce a product of suitable color and odor, and to bring the protein up to its most effective condition for livestock feeding purposes. There is an optimum point of toasting, neither too high nor too low, for best results as feed for livestock. This optimum point of toasting must be learned through research and a great amount of experience. After toasting, the flakes are cooled, ground, analyzed to see that proper standards are maintained, and sacked for shipment to the trade.

Believe in Future

Swift & Co. have confidence in the future of the soybean business as indicated by their large expenditures for soybean processing facilities throughout the bean belt. Here also rapid progress is being made. Each new mill or elevator we build is better equipped to handle the processing of soybeans than the previous installation. Our latest mill to go into operation at Frankfort, Ind., some 60 miles southeast of here, was a model solvent extraction plant when it started operations a little over 2 years ago. However, much money has been spent in these 2 years to keep it up-to-date and to improve operations. We have another solvent mill now under construction at Champaign, Ill., which will be the most modern and efficient we know how to build.

Swift & Co. are keeping informed on developments by others and in addition are conducting pilot plant tests on other solvents, newly designed equipment, and general developments in an effort to further improve operations. Only by hand-in-hand development and progress by the producer and processor can the soybean industry reach the heights of success which it justly deserves. Swift & Co. will do its part.



A couple of Kankakee business men and a Chicago banker stop to talk to Borden Co. officials before making a tour of the new Borden soy processing plant at Kankakee. Left to right: Arthur G. Osgood, assistant vice president of the Harris Trust & Savings Bank, Chicago; Clifford E. Butler, president of the Borden Soy Processing Co.; William A. Sommer, manager of the Kankakee plant; Arthur L. Beckman, president of the Kankakee First Trust & Savings Bank, and Burrell Small, managing editor of the Kankakee Journal.

BORDEN CO. OPENS PLANT AT KANKAKEE

The new solvent type soybean processing plant which has been under construction at Kankakee, Ill., for two years by the Borden Co. was officially opened at ceremonies held on Thursday, November 18. Representatives of the grain trade, members of the Kankakee Chamber of Commerce, and customers of the company were invited to attend the opening along with all Borden stockholders in the state of Illinois. Wm. A. Sommer, manager of the Kankakee plant, was in charge.

The Borden plant has a capacity of approximately 6,000 bushels of soybeans per day, and will turn out about 60,000 lbs. of soybean oil and 145 tons of meal per 24-hour period. Concrete storage facilities accommodate 960,000 bushels of soybeans, and facilities have been provided for both carload and truckload handling.

Highlight of the opening ceremonies was the annual Chamber of Commerce dinner at Knights of Columbus Hall, when the Kankakee Chamber of Commerce officially welcomed the Borden plant officials and employees to the city. Speakers were C. E. Butler of Waterloo, Iowa, president of the Borden Soybean Processing Co., and Chas. F. Kieser, New York, vice president of the Borden Co., who is in charge of the special products division, of which the Kankakee plant is a part. These two men were made honorary citizens of Kankakee, with the Hon. A. F. Hattenburg, mayor of the city of Kankakee, making the presentation.

The Kankakee plant is the second placed in operation by the Borden Co., the other being at Waterloo, Iowa. A new expansion program is now under way at Waterloo, where solvent facilities are being added to the already existent expeller type plant in operation there.

Here A. J. Lewis, Northern Regional Research Laboratory paint chemist, applies first coat of an experimental soybean oil paint to a panel for weathering tests.

Paints from SOYBEAN OIL

By A. J. LEWIS[1]

Northern Regional Research Laboratory[2] Peoria, Illinois

OUR WORK with soybean oil in the protective coatings field began at Urbana, Ill., in the fall of 1936. We inherited the exposure test fences at the South Farm of the University of Illinois which had been constructed and used for testing the durability of interior and exterior paints containing up to 35 percent of soybean oil. These paints were experimental ones made by various manufacturers at the request of Dr. W. L. Burlison, a pioneer in the soybean field, not only in agronomy, but also in the field of industrial utilization. His work with interior paints began in 1931, and with exterior paints in 1932. The paint panels, prepared under his supervision, served the dual purpose of determining the relative durability of paints containing soybean oil and those containing linseed oil only, and of demonstrating to manufacturers and the general public that soybean oil was not injurious in paints.

The Laboratory at Urbana manufactured its own paint products from raw materials, simulating commercial practice. We utilized soybean oil either in blends with other oils, such as China wood, perilla, dehydrated castor, and linseed oils, or often as the sole oil vehicle. Our first achievement at Urbana was making a hard-drying varnish from Bakelite Resin No. 254 with refined soybean oil as the only oil. By cooking the resin and oil at 600 degrees F. we were able to make this varnish in an hour, and when thinned and treated with cobalt drier, this varnish dried hard enough in 24 hours for sanding or rubbing to surface, just as a short-oil rubbing varnish does. Also, this varnish proved not only extremely durable in weathering tests, but it was very resistant to acids, alkalies, alcohol, gasoline, and both hot and cold water. This varnish received considerable publicity, especially from the scientific section of the National Paint, Varnish, and Lacquer Association.

Another achievement at Urbana was the making of exterior white paints from 100 percent refined soybean oil and pigment blends of basic carbonate lead and zinc oxide. These paints were rated for durability by weathering tests in comparison

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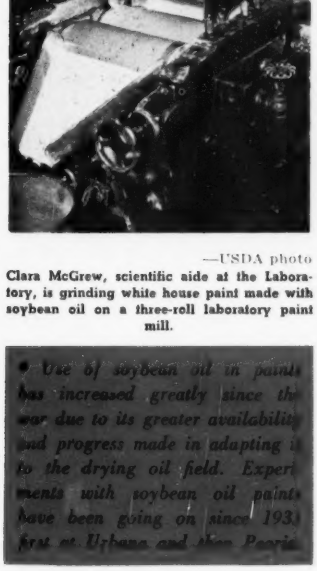
[1] Presented at Cooperative Soybean Oil Mills Conference, Northern Regional Research Laboratory, May 25-27, 1948.

[2] One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

—USDA photo

Clara McGrew, scientific aide at the Laboratory, is grinding white house paint made with soybean oil on a three-roll laboratory paint mill.


Use of soybean oil in paints has increased greatly since the war due to its greater availability and progress made in adapting it to the drying oil field. Experiments with soybean oil paints have been going on since 1931 first at Urbana and then Peoria

with similar paints containing 100 percent linseed oil, and with a 50-50 blend of soybean and perilla oils. To make the tests more difficult for soybean oil, which does not dry as fast as linseed, we prepared our panels by giving them three coats, and allowed a drying time of only 24 hours between the coats before starting the exposure tests. After almost 4 years of exposure, the results, published in *Oil, Paint, and Drug Reporter* (August 25, 1941) showed:

1. Exterior white paints containing 100 percent soybean oil as the oil vehicle, made in accordance with the above formulations and containing 28 percent of oil by weight, were equal to similar linseed oil and blended perilla-soybean oil paints in resistance to chalking or to surface checking.

2. Similar comparisons of paints with 38 percent of oil by weight showed that all the 100-percent soybean oil paints were slightly superior to the other two oil paints in resistance to chalking but slightly inferior in surface checking of the paint films.

3. Similar comparison of paints made with 48 percent of oil by weight showed that all the paints containing soybean oil weathered away by chalking more rapidly than similar linseed oil paint films but that the latter films became brittle as shown by their checking and particularly by the chipping of the film from the 40 percent zinc oxide paint.

It should be noted that paints containing 48 percent of oil by weight are considered by many authorities to make the best wood-priming coats, and for this purpose the paints containing all or half soybean oil may be considered as superior to paints with all linseed oil. Paint films of the former do not become checked or brittle like those resulting from use of linseed oil paint.

4. The above paints made with 100 percent soybean oil have shown very satisfactory durability after nearly 4 years of continuous exposure tests, even though tested under an air drying schedule of 24 hours between coats, and 48 hours' air drying before exposure. This drying schedule was intended as a very severe test for soybean oil in paints, and the above results show that paints made with 100 percent soybean oil, or with blended soybean-perilla oils when correctly formulated with the proper pigments and driers are equal in durability to similarly formulated linseed oil paints, even when the paints are air dried on the very short schedule of only 24 hours between coats.

Another paint made at Urbana from 100-percent soybean oil was white "traffic marking" or "line" paint. This type of paint must dry very rapidly, within 15 to 30 minutes, and must remain white over a bituminous road bed. We found that bodying refined soybean oil with maleic anhydride produced a heavy bodied oil which, when thinned and blended with a resin, could be pigmented to produce a durable, fast-drying road-marking paint. This paint passed tests conducted by the Ohio State Road and Highway Commission. Fast-drying and durable red barn paints have also been made from this type of treated oil.

Gather Dust

One criticism of paints containing large quantities of soybean oil has been that the coatings pick up and retain dust and dirt to such an extent that they become unsightly in service. This condition, caused by tackiness or stickiness of the film, is noted especially when the pigment content of the paint is basic carbonate of white lead. There are two kinds of tack, one called residual which remains on the film surface and another, called after-tack, which is caused by the film softening or becoming liquid again as the result of exposure to sun heat, humid weather conditions, or other reasons. These tack conditions cause the collection and retention of dirt in the same way that fly paper retains flies. It has been our experience that certain pigment formulations, together with high pigment volume in the paint, can be utilized for making paints containing no other oil than soybean, and that the coatings from these paints will be free from dirt collection and retention when exposed to weathering tests.

Recently we found that the addition of small amounts of calcium oxide or lime to paints containing principally refined soybean oil caused the coatings of these paints to dry without residual or after-tack. These coatings, when exposed to weather during the hottest days in July, were found to be exceptionally free from dirt retention and discoloration. In addition, we have noted that the durability of the coatings has been improved when lime was used in the paint. On comparative tests both by accelerated and by outdoor exposure we have found that checking, cracking, and chalking have been greatly retarded when the pigment of the paint coating contained 5 percent by weight of lime. The results to date on the improvement of paint coatings through the addition of lime may mean that paints having 100 percent soybean oil vehicles can be made from the poorer drying pigments, and that their coatings will dry satisfactorily and remain clean and durable in service.

The Future

The future of soybean oil in the protective coatings field will probably be determined by the demand for edible soybean oil. If a shortage continues in the world supply of edible oils, then less soybean oil will be available in the drying oil field, just as during the recent war. The amount of soybean oil going into the drying oil field has increased greatly since the war, most of it going into the manufacture of alkyd varnishes for use in enamels and paints. The considerable amount used in paints is in mixtures with linseed oil, although a few 100-percent soybean oil paints are available on the market.

Today there is much research activity for improving the drying qualities of soybean oil, such as reacting either the oil or its fatty acids with various chemicals to give special oils tailored for specific purposes, and also fractional separation of the fatty acids by distillation or by crystallization in the cold. The separation of soybean oil into two fractions by furfural or by liquid propane seems to give great promise for the proper utilization of soybean oil. This separation gives one fraction that is more suitable for edible purposes and another that is more suitable for coating purposes. Our tests have shown that paints from the more-unsaturated fractions are equal or superior to paints from linseed oil in drying qualities, color retention and durability.

Big warehouse of Missouri Soybean Co. at Caruthersville, Mo., filled with soybean seed.

STICK OUT YOUR CHEST

The author, after considerable traveling, still believes that the "Double Duty Land" of southeast Missouri and northeast Arkansas has much to recommend it.

By

GEORGE HEARTSILL BANKS

Wardell, Mo.

From a talk at the soybean yield contest banquet at Blytheville, Ark., Nov. 30.

DOWN IN southwest Arkansas a young veteran of several foreign campaigns was telling about where he had been and what he had seen. Lum Rumpot, who hadn't been sober since Woodrow Wilson's Administration, listened a while and then said "Have you ever had a bad case of Delirium Tremens"? Receiving a reply in the negative, he said in his most dignified manner "Well, Bud, in that case, you ain't never been no place and you ain't never seen nothin'."

As I've gone over a considerable portion of this world's agricultural area, and talked to thousands of agriculturally-minded people, I ask them if they have ever seen the Delta from Memphis to Sikeston. If not, I maintain, "they ain't been no place and ain't seen nothin'."

Across the Pacific, across the Atlantic, across the Caribbean, even just across the Mexican border, and you find the "have-not" countries of Asia, Europe, North Africa and Latin America. Not to an equal degree by any means, but compared to the United States, these countries simply do not have many of the things we consider absolute necessities. I will spare you the statistics of how many more cars, trucks, telephones, plumbing facilities and such that we in the United States have than these countries. One figure will suffice: for every five people in the United States there is one automobile; there is one automobile to every 389 Russians.

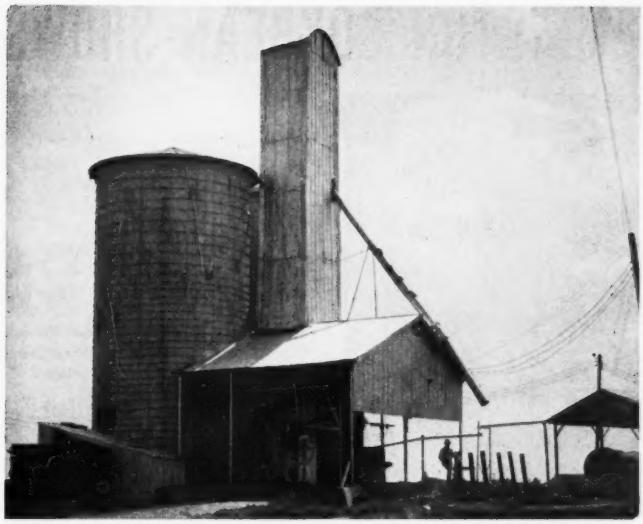
After landing in San Francisco after my recent stay in Japan and Korea I made a pretty thorough tour of the United States, including such key points as Los Angeles, Pueblo, Topeka, Kansas City, St. Louis, Washington, Tulsa, Little Rock and Memphis. For once my eyes were wide open, drinking in the sights of this great America of ours. If you ever feel your appreciation slipping, I recommend 2 years in the Orient.

Then I came home: to the upper Mississippi Delta; to the country between Memphis and Sikeston: to that vast but homogeneous body of land, embracing all or almost all of six counties in northeast Arkansas and six counties in southeast Missouri. What the Orient lacked utterly; what other parts of the world lacked in varying degrees; what most of the United States barely has, I found here in greatest abundance.

It was the progressive spirit of this region that prompted the growth of what was then a new crop, the soybean. New to us, yes! but one of the oldest plants known to the Oriental farmer. Many of this group began growing beans before there were any satisfactory varieties; some were too late and paid a heavy toll to early frost; some were not desired by the buyer of commercial beans; one very popular bean was given to shattering, one day you had a bean crop and the next week the beans were popped out. Harvesting machinery was almost non-existent and not many knew how to operate it. In spite of all this, you persisted in soybeans, and your success is attested by your presence at this meeting.

Oh! yes: I know it took good leadership. Ed Critz was one who didn't have any quitting spirit in him. In 1937 I was told that Mr. Joe Wallace had a system: instead of toys or rubber rings, he weaned his boys on tractors and A. C. combines. Anyway those boys, now long since grown into manhood, set the lead in harvesting and taught dozens of other farmers the fine points of getting maximum results from combines. There were other leaders too numerous to mention here, all of whom reflected credit to this progressive spirit I seem to say so much about and that is so characteristic of this part of the valley.

So we come to a few, a very few statistics on Mississippi County's soybeans. Some



—Photo by Lee Wilson & Co.

Soybean elevators like this one belonging to Lee Wilson & Co. at Victoria, Ark., will help to solve the area's marketing and storage problem.

You see trucks of soybeans lined up on the viaduct to the Buckeye Cotton Oil Co. mill in Memphis, Tenn., waiting their turn to unload. Ideal harvesting weather this fall brought a record breaking movement of soybeans in the South. Hundreds of trucks jammed Memphis streets, waiting to unload and rapidly filled to overflowing all available storage space. Some mills could handle only as many truckloads as they could make room for by crushing beans during the day. The entire South had the same situation.

one has said "Cotton may be King, but the Soybean is his Prime Minister." Only a few years ago we were not far enough along to rate a single statistic. As recently as 1939 we were 65th in rank of production among American counties. Reflect upon the fact, then, that in 1946 Mississippi County was 10th, and may go even higher in the near future. I am told there are 23 contestants in the 1948 yield contest, whose average yield is 40.09 bushels per acre. These are figures of which you should be and I am sure are mighty proud. About twice the national average.

Mississippi County, Ark., is a big factor in the character of this entire section. I feel we should think a while in terms of this 12-county area, including the Arkansas counties of Mississippi, Crittenden, Poinsett, Craighead, Green and Clay, along with the Missouri counties of Pemiscot, Dunklin, New Madrid, Stoddard, Mississippi and Scott. The 1948 figures may be larger, but consistently this 12-county area produces about 1 million bales of cotton along with 500,000 tons of seed, and something like 10 million bushels of soybeans.

Soybeans are well-established; farmers have suitable combines and tractors; the bean handlers have made larger strides in making the marketing convenient and consistent; and both the farmer and the handler have a lot of "know-how" when it comes to growing and marketing the crop. We need more funds for fighting the soybean's battle in Congress but that's a story you will hear more about in the near future. It calls for a little more of that co-operative spirit that is so characteristic of this fine country.

This group doesn't need any talk about the uses of soybean oil, soybean meal, cotton seed oil or cotton seed meal. Vegetable oils, especially edible vegetable oils, have assumed national and even international importance in recent years, and our two crops produce an abundance of highest quality vegetable oil (about 3 million gallons annually). And our entire national livestock program is based on the balancing of carbohydrates with protein concentrates, the latter of which we produce about 444,500 short tons. To go over into the Chamber of Commerce field for a moment, if all this oil was put into tank-cars and all this protein concentrate was bagged and loaded into 40-ton box cars it would make a train that would reach from West Memphis to Sikeston.

Growing a lot of good cotton is not entirely unique; other sections of the South do this. Growing this large volume of beans is not distinctive; sections of Illinois and Iowa have concentrated pretty much on soybeans. The thing which sets our country apart from the rest of the world is that our farmers alone grow both these crops. When Texas or Mississippi cotton farmers rotate, they used several different crops, but seldom is there seen a cotton-soybean rotation. The soybean farmer of Illinois rotates but the alternate crop, be what it may, is not a producer of (1) vegetable oil, and (2) protein concentrate.

Our distinction lies, therefore, in that all our acres come close to producing vegetable oil and protein concentrates *every* year. It is growing both these crops that makes us so economically important to the nation and to the world. Our farmers, and our acres, are not content to grow cottonseed or soybeans; theirs is a double duty, to produce cottonseed *and* soybeans.

Since these 12 counties are contiguous and all participate in this double program, we should consider some way of ignoring that imaginary thing we call the state line, and consider some way to designate this area as a whole. One term strikes me as appropriate; based on the fact that two states and two crops are involved. How about "DOUBLE DUTY LAND?" Here in these favored sections of the two great states of Arkansas and Missouri, let us think how fine a thing it is to live and be a part of an area deserving of such an inspiringly comprehensive title as "Double Duty Land."

We have the people, we have the soil, we have the climate, we have the production. Our acres produce in the greatest abundance known to man the two great crops of cotton and soybeans. Let's emulate the "Booster Boys" and let everybody know what we have. As Dizzy Dean used to say "If you talk big and then go on and act big, it ain't bragging." You've got everything, boys. Come on now, you leading citizens of "Double Duty Land"—*Stick out Your Chests.*

BLYTHEVILLE, REMINGTON SOYBEAN SHOWS

—Atkinson photo

Mr. Daily, manager of the Farmers Cooperative Co. of Remington, Ind., presents his company's trophy to Wayne Sommer for the third time. Sommer, who was sweepstakes winner at the Remington Soybean Show also in 1945 and 1946, became permanent owner of the trophy.

WAYNE SOMMER WINS REMINGTON TROPHY

Wayne Sommer of Remington, now a Purdue University junior, was the grand sweepstakes winner of the 11th annual Remington, Ind., Soybean Show December 14.

Sommer was also sweepstakes winner in 1945 and 1946. He thus became permanent owner of the Farmers Cooperative Co. of Remington trophy that is awarded each year to the winner of the show. The trophy was first offered in 1943 and has had only three winners in the past 6 years. Sommer entered the open class for all soybean varieties.

Russell Hunter won the yield contest with a yield of 43.2 bushels per acre. Mrs. Arthur Cooper was reserve champion of the show. She was champion of the farmers division, entering Lincoln soybeans.

Speakers included: L. C. Miller, general division superintendent of Swift & Co. oil mills and refineries, Chicago, on the subject, "Inside the Soybean," published elsewhere in this issue; Ersel Walley, president of the American Soybean Association, Fort Wayne, Ind., on "Soybeans Are Worth More"; and Paul C. Hughes, field service director of the American Soybean Association, Hudson, Iowa, who described the Association's finance program and announced that it would be put into operation in Indiana this coming year.

K. E. Beeson, extension agronomist, Purdue University, Lafayette, Ind., presided at the round table discussion following the speeches.

Other championships of the show: certified seed, Diener Bros., Reynolds, with Hawkeyes; vocational division, Gene Walton, Remington, with Lincolns; junior agriculture division, Vern Lehman, Remington, all varieties; Benton County 4-H division, Gene Jennings, all varieties; Jasper County 4-H division, Bill Schembs, Remington.

The Remington Soybean Show is sponsored annually by the Remington Service Club in cooperation with the vocational agriculture department of the Remington school and the extension service of Benton and Jasper Counties.

The Farmers Cooperative Co. of Remington will put up another trophy for the sweepstakes winner next December, Daily announced.

LONG IS MISSISSIPPI COUNTY SOYBEAN CHAMP

C. D. Long, Rt. 2, Blytheville, was winner of the second annual Mississippi County, Ark., soybean yield contest. He entered the most productive 5-acre field of soybeans in this year's contest, sponsored by the Blytheville Junior Chamber of Commerce.

—Photo by Kathryn Oenning

C. D. Long, Rt. 2, Blytheville, Ark. (center) receives "Ed Crits" trophy from D. E. Robison, chairman of Blytheville Jaycee agricultural committee (right), while Heartsill Banks looks on approvingly at annual Jaycee soybean yield contest banquet.

Long averaged 49.53 bushels per acre, almost 9 bushels more than the winner last year. H. C. Weathers, Burdette, was a close second, with an average production of 49.06; and C. L. Wylie, Blytheville, placed third with an average of 47.42.

Average production of the 24 entrants in the contest was 40.6 bushels per acre! This was as large a yield as was turned out by the winner last year.

Long was presented with the "Ed Critz" trophy and a $100 cash award at the annual Jaycee-sponsored soybean yield contest banquet November 30. G. H. Banks, plant breeder for Acom Farms, Wardell, Mo., was speaker of the evening.

Long and Wylie both grew Dortchsoy 2; and Weathers the Ogden variety. Average yield of the Dortchsoys grown in the contest was 42.91 bushels per acre. Average yield of the Ogdens was 40.62. One field of Ralsoy soybeans was grown, producing an average of 35.15 bushels.

It was reported that 250 acres of the Blytheville air base, which had been sodded in Bermuda grass for 5 or 6 years, had been rented by Bob Lee Smith and Carl Wallace and plowed up and drilled to Dortchsoy 2 soybeans. Five acres of the field were entered in the yield contest, and produced 40.31 bushels per acre.

—s b d—

SEEDBURO AGENTS

Seedburo Equipment Co., Chicago, Ill., has announced the appointment of Jacob Hartz Seed Co., Inc., Stuttgart, Ark., as sales representative for the Seedburo line.

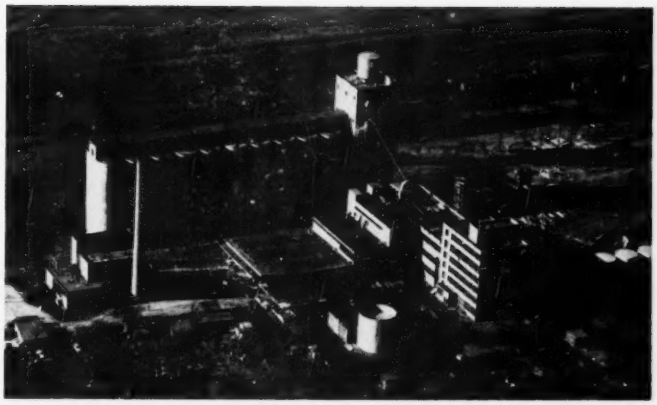
This pioneering and progressive company

JAKE HARTZ, JR. MARION HARTZ

has been serving the grain and seed trades since 1911, and is well qualified by experience to handle and service the Seedburo line.

Two of the key men, well known in the seed business, Marion Hartz and Jake Hartz, Jr., will spend a major part of their time in selling the Seedburo line of equipment and supplies. Marion Hartz will sell in the field, while Jake Hartz, Jr. will devote his time to customer service and sales in the office.

Jacob Hartz Seed Co., Inc., has an intimate knowledge of the Arkansas territory and the requirements of its grain men and seedsmen.



Minnesota Linseed Co., Minneapolis, now has storage for 1 million bushels of soybeans or flaxseed.

OPEN NEW MINNESOTA PROCESSING PLANT

The Minnesota Linseed Oil Co. has announced the formal opening of its new vegetable oil processing plant, located in Fridley township just north of Minneapolis. The accompanying aerial view shows the complete plant, which is described as the finest and most modern oil processing plant in operation today.

Storage for 1 million bushels of flaxseed or soybeans is provided in the concrete tanks which are seen adjacent to the 5-story workhouse where grain is weighed, cleaned and distributed.

The preparation building contains 16 screw presses to scalp off part of the oil from the whole flaxseed. The cake from these machines will contain 16 to 20 percent oil. The capacity of this milling operation will be about 330 tons of flaxseed per day and 240,000 pounds of oil.

The extraction building makes this plant different from other linseed mills. It accounts for the "new process" linseed meal—a product of 36 percent protein content. All the rest of the mill is designed around this 62-foot tower.

The extraction tower has 38 iron baskets which make a clockwise circuit once an hour in ferris wheel fashion. Loaded with flakes at the top of the tower, the baskets begin on a downward trip. Solvent is sprayed on the basket at the top and drains through the perforated bottom of all the baskets and thus to the bottom of the tower.

To remove the solvent from the oil, a 4-story distillation column is used. About 125,000 gallons of solvent are pumped through the extractor in a day's operation. Twelve to fifteen hundred gallons of water per minute are also used in the condenser during the operation. The plant will be able to deliver 4,000 bags of linseed meal in a 24-hour day.

E. H. Russell is president of Minnesota Linseed Oil Co. F. P. Parkin is general superintendent of the new Fridley plant.

RADIOACTIVE BENEFITS?

Use by farmers of radioactive materials on crops including soybeans in an effort to increase yields is probably money thrown away.

This is indicated by experiments with certain low level radioactive materials conducted during the 1948 crop year in 14 states and with 18 crops, the U. S. Department of Agriculture reports. Soybeans were included in the experiments. So far no beneficial effect on either crop growth or quality has been shown.

The studies were undertaken in March of last year at the request of the Atomic Energy Commission to determine the effects of radioactivity on plant growth. State experiment stations cooperated.

The materials used to apply radioactivity were a commercial radioactive product and radium. States where the field experiments were conducted included Illinois, where corn, soybeans, oats and alfalfa were tested.

—s b d—

FOOD FROM ALFALFA

If it can be made more palatable, alfalfa could be used as a base for the preparation of a low-cost, protein-rich food a recent meeting of the Institute of Food Technologists in Los Angeles was told. Henry Borsook, biochemist at California Institute of Technology, explained to the joint membership of the northern and southern California sections that alfalfa produces more protein per acre than does any other crop.

If our food larder should ever become bankrupt to the point where populations are willing to "eat hay," this unpalatable legume might be utilized in a formula similar to that used in the all-purpose dry food now being sent to relieve starvation in Europe.

Dr. Borsook briefly reviewed the development of MPF (multipurpose food) of which soybean grit is the most important ingredient.

C A S T O R B E A N S

Field of castor beans.

A Review of the Experimental Work in the United States

By R. O. WEIBEL and W. L. Burlison

Assistant Chief in Crop Production and Plant Genetics, and
Head, Dept. of Agronomy and Professor of Crop Production University of Illinois.

THE CASTOR BEAN *(Ricinus communis)* is not a legume or true bean but a member of the spurge family. It has come down from antiquity to the present, little changed in general characteristics. It is the Palma Christi tree of Biblical times sometimes referred to as Jonah's gourd. The name Ricinus is a Latin term meaning dog-tick which the seed was thought to resemble.

Mature spikes of the Conner variety of the castor plant.

With regard to the history of the castor bean plant, C. M. Dougherty[1] writes the following:

"The castor plant is one of the most interesting in the world's flora. Tropical in its origin, the antiquity of its culture is attested, first, by seeds found in the sarcophagi of the ancient Egyptians, and later, by records of the utility of the plant in the earliest writings of the Hindus. Indigenous either to Africa or India, it has been carried by the many migrations of men in the course of ages to all parts of the tropical and subtropical world. The remarkable beauty of its foliage has also led to its culture as an ornamental plant far north of where it can be raised for industrial uses. A perennial in tropical climes, it grows to a height of 30 or 40 feet, but acclimated in cooler zones it becomes an annual, and attains a height of only from 8 to 12 feet. From the botanical, as distinguished from the cultural point of view, it is now widely distributed over all the warmer regions of the earth.

Introduction in U. S.

"The man who first brought castor beans into the United States has left no record of his achievement, and succeeding generations who fostered his enterprise have been scarcely less mute. A small crop, limited at even the highest stage of its development to groups of counties rather than to states, its early history is naturally lost in oblivion. The salient fact is that the crop has always been largely localized in parts of the states of Illinois, Missouri, Kansas and the territory of Oklahoma. Incidental mention is found of its cultivation in Illinois before that state was admitted into the union in 1818. Within the next quarter century there are occasional references to experimental culture in Georgia and other southern states. But not until 1850 were there comprehensive data indicating the geographical distribution and extent of the crop."

There were 23 castor oil mills in the United States in 1850. Ten of these were in Illinois, three in each of Missouri and Virginia, two in each of Ohio and Tennessee and one in each of Pennsylvania, Alabama and Arkansas. St. Louis was the commercial center in the west and 70 percent of the domestic production of castor oil was produced there. A mill, the largest of its kind, was built in Jersey City, N. J., in 1857. This mill processed some of the domestic production, but soon became the center for imported seed. Production became spasmodic and areas of production shifted so that by 1870 there were only six mills in operation with three of these in Texas and one in each of Missouri, New Jersey and Tennessee. This same shifting continued with new mills starting at various places only to operate for a relatively short time and then at irregular periods. New mills on the east coast to handle imported seed operated more regularly and the mills in operation at present are located there.

It is interesting to review the production

[1]The Castor Oil Industry by C. M. Dougherty—Yearbook of Agriculture—1904.

• *One in a series of articles about oilseed crops which compete with soybeans. Others have appeared and will appear from time to time.*

records in the United States. Production built up to a peak about 1879 and was greater than the demand. Importations declined greatly during this period. This overproduction had the normal economic result that has happened so many times. United States production was cut very sharply and some states such as Kansas which had been a leading area of production nearly stopped production entirely. This period of low production continued in the United States and import trade not only regained its place, but began to be more important than domestic production. This trend has continued and at present no commercial acreage in the United States is reported and we are wholly dependent upon importations.

It is equally interesting to review the source of importations into the United States. Again a quotation from C. M. Dougherty as of 1904:

"The one great castor bean producing country of the world is British India. Although not produced there as crops are reckoned in these days in mammoth proportions, that country probably has a greater monopoly of the world's production of castor beans than has the United States of the world's crop of cotton or of corn. From British India is derived almost the entire supply of castor beans that enter into the international trade of the civilized world."

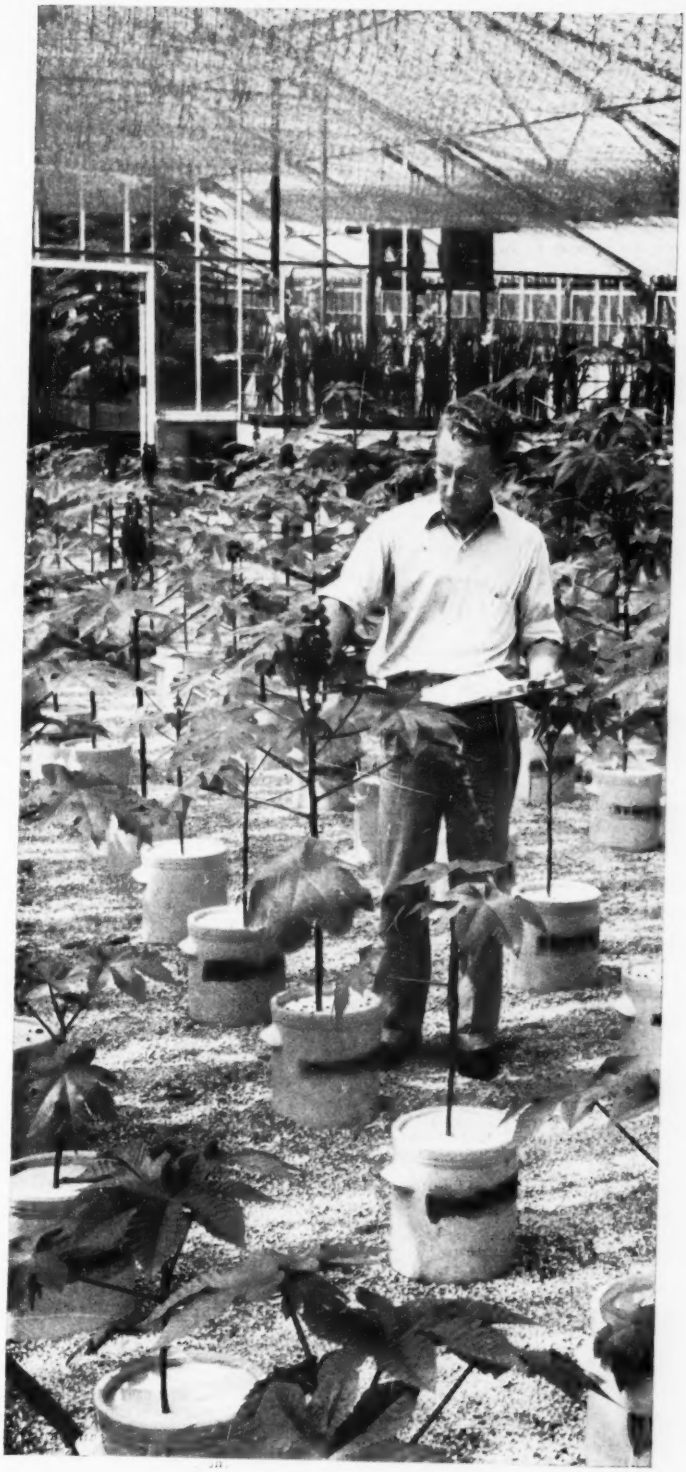
Exports in 1890 from this country were 2,003,973 bushels of beans and 3,198,787 gallons of oil. Exports in 1904 were 3,509,717 bushels of beans (a million and a half more than 1870) and 2,300,015 gallons of oil (about a million gallons less than 1870).

The castor bean plant grows wild in many parts of South America and more recently has been cultivated in some of these areas. Export trade has been carried on from Brazil and Argentina. Mexico has grown castor beans under cultivation for at least 50 years. During the war crisis when castor oil was so important, our imports were almost entirely from Brazil and Mexico.

Uses of Castor Bean

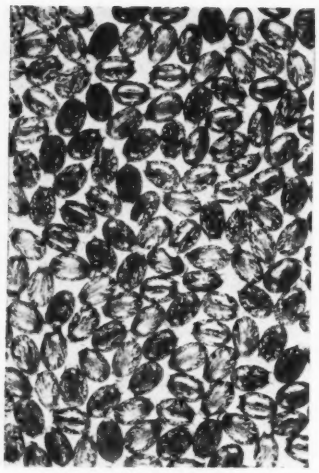
Oil. The important uses of the castor bean plant have been focused on the beans and more specifically the oil which is extracted from them. Castor oil has unique properties and is used in the manufacture of many and various valuable products.

A quotation from a letter dated April 21,



—USDA Photograph

At right, Dr. Neil W. Stuart, plant physiologist, checks growth of castor bean plants in sand cultures in a greenhouse at the U. S. Horticultural Station, Beltsville, Md.



Seed of the Conner variety.

1944 to the authors from J. Edmond Good, Woburn Chemical Corp., is pertinent.

"A number of new uses for castor oil have come into effect in the last 5 years which greatly increased the amount of castor oil consumed. Some of these new uses are war uses and will be discontinued, but the larger part of the new uses and those which account for the greater proportion of the increase are not directly connected with war and therefore, are likely to continue. During the year 1944 the industries of the country used approximately 10 times as much castor oil as they used in the year 1939. I believe it is safe to assume that in the future the amount of castor oil regularly used by industry will be five to six times that used in the year 1939, that is, before the war."

Dehydrated castor oil is the largest new development for castor oil. It is used as a fast drying oil for paints and varnishes. In a personal letter from G. H. Priest, Jr. of the National Paint, Varnish and Lacquer Association, the following statement was made.

"Our total consumption of castor oil increased from 24 million pounds in 1940, to 51 million pounds in 1942 and to 77 million pounds in 1944. Of this, dehydrated castor oil accounted for 64 million pounds of the 1944 consumption."

A sizable volume of castor oil is now being used in the conversion to sebacic acid and capryl alcohol and its derivatives. These products are used in the plastics industry. The use of castor oil in the production of special lubricating oils, hydraulic fluids and recoil mechanisms certainly played a major role in the recent war effort. There are many other important uses of castor oil, such as that used in the manufacture of soaps, printing inks, emulsion breakers, textile dying materials, leather preservatives, artificial leather, linoleum, oil cloth and many others.

Pomace. After oil extraction the remnant of the bean is known as castor pomace. Castor beans contain a poisonous substance making the pomace unsuitable for livestock food, but because of its high nitrogen value it is used by the fertilizer industry. The use of castor pomace as a fertilizer is well established and there is little or no likelihood that the supply will ever exceed the demand.

Leaves. As stated previously most of the attention has focused on the beans for their oil, but other parts of the plant have been subjected to research for possible uses. Extracts from the leaves and young stems have insecticidal value. The Woburn Chemical Corp. has developed a product called "Sprakast."

Stems. The stems are a source of pulp and cellulose which can be used in the making of cardboard containers, wallboard, newsprint, kraft and other paper materials. Cost of collecting stalks and transportation to mills has been too high in most cases to allow this product to compete successfully with existing sources of pulp and cellulose.

Problems of Harvesting

Without exception the plant breeders and industrialists who were contacted during the preparation of this report made the statement that until the harvesting problem could be solved there was little hope for commercial production in the United States. This problem is one on which the plant breeders and engineers must work together.

The first character of importance is size of the plant. Relatively short plants (3 to 5 ft.) with fine stems are more desirable because they can be harvested with less difficulties.

The second character of importance is the shattering of the seed and capsules. Many strains of castor beans drop, or more correctly throw, their seed as soon as it is ripe, and often before all are ripe on the same spike. Other strains are more resistant to this type of shattering and while the beans are held in the capsules, the whole capsule may drop from the plant due to a jar or brushing of other plants. These are mainly problems for the plant breeder, but the engineer can do much to develop machines that are better adapted to harvest this type of plant.

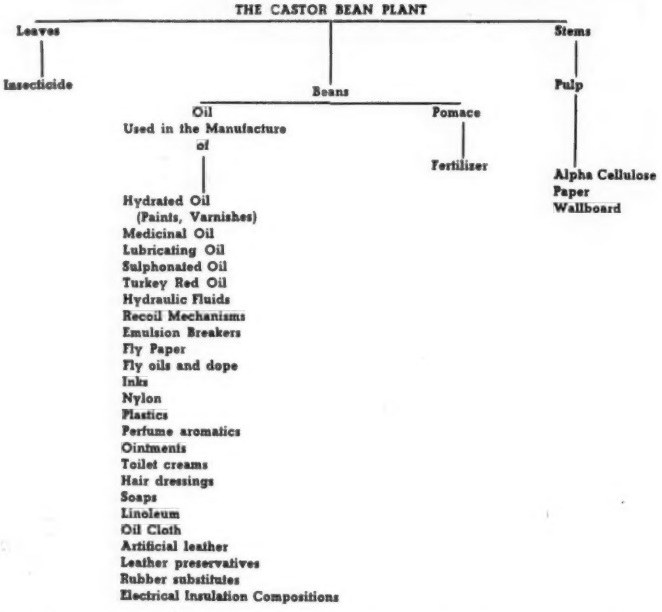
The small grain combine has been used with various degrees of success.

Machine companies have made some attempts to adjust their small grain combine to the harvesting of the beans. In talking personally with an engineer of one company who had had some experience harvesting castor beans in one of the southern states, he made the statement that:

"The combine cannot be used as it is used for small grains, but I feel certain that if and when the problem warranted further study a machine could be adapted." It would seem then that while the problem has not been solved it is certainly not hopeless.

When the beans, or more correctly capsules, have been harvested a hulling machine is necessary to separate the beans from the

FIGURE 1. — Utilization of the Castor Bean Plant*



*This does not necessarily represent all the uses made of the castor bean plant but only those which have been brought to the attention of the writers. The order of uses does not necessarily indicate relative importance.

hulls. Several machines have been built which do a successful job with little damage to the beans. At least one of these is in commercial production. This machine was developed at the University of Tennessee, agricultural engineering department, and is now being manufactured by the Turner Manufacturing Co., Statesville, N. C.

Recent Research

During the early period of World War II when it appeared that our imports of castor beans and castor oil might be cut off, the U. S. Department of Agriculture launched an intensive program to (a) determine the area in this country best suited to the production of castor beans; (b) collect, evaluate, and increase seed supplies of the available strains; and (c) determine the most effective cultural methods and what production problems might be encountered. These tests were conducted in 1941, 1942, and 1943 and were made in 22 states, in the southern half of the United States. This work has been summarized by Domingo and Crooks.* Conclusion from these reports follow:

First. Adaptation is mainly determined by three major factors, disease, length of growing season and rainfall. Only one disease Gray Mold, *Scleotines recini* Godfrey has been definitely found to be important in this respect. This eliminates a sizable area of the Gulf Coastal region from the area of adaptation. Yields of the three common varieties, Conner, Doughty 11, and Kentucky 38, have, in general, been good in areas with growing seasons of at least 180 days, while production was hazardous in areas with shorter growing seasons. Observations in Kansas, Oklahoma and Texas indicate that between 15 and 20 inches of rainfall during the months from April to September are essential to satisfactory yields. These three factors outline an area of adaptation for the present varieties which includes, roughly, the southeastern half of Kansas, Missouri, the southern third of Illinois, southern Indiana, the southern tip of Ohio, the western and central parts of Kentucky and Tennessee, Arkansas, all of Oklahoma, except the panhandle, and the part of Texas north of Dallas and east of Lubbock and the part within a radius of about 50 miles of Corpus Christi.

Second. The soils best adapted for castor beans have (a) exceptionally good surface and underdrainage; (b) sufficient subsoil permeability to insure the adequate movement of air and water and the growth of roots; and (c) the capacity to warm up readily in the spring.

Third. On the basis of yield and ease of hand harvest, the optimum number of plants appears to be about 5,000 per acre, which is roughly one plant each 2½ feet in 40 or 42-inch rows.

Fourth. The optimum planting date in most of the region of adaptation appears to be a few days ahead of corn planting time for the particular area.

Fifth. Eight fertilizer tests in Kansas, Kentucky, Mississippi, Missouri, and Oklahoma failed to show any marked yield increase from nitrogen, phosphorus or potassium, either alone or in combination on the Conner variety of castor beans. The only significant increase from any treatment was with phosphorus alone at Princeton, Kentucky. In the same test phosphorus with nitrogen and potassium produced no such increase.

Sixth. Conner, Doughty 11 and Kentucky 38 were the varieties studied most critically in these tests. Delayed harvest until after frost of these three varieties resulted generally in significant loss of seed by shattering. Both Conner and Doughty 11 were observed to lodge and shatter less than Kentucky 38.

Varietal Yield Trials

The Illinois Agricultural Experiment Station has 6 years' results on several varieties of castor beans. The variety Kansas Common has given the highest average yield at Urbana. The 6-year average is 1,434 pounds per acre. This variety seems to be the most promising from the standpoint of its present status as a variety and also as a source of new material or selections. Yields in southern Illinois have been considerably lower with yields of 500 to 700 pounds per acre expected.

Cost of Production

If we are to encourage the growing of castor beans we must know something of the return to the farmer. In 1943 R. H. Wilcox of the University of Illinois, department of agricultural economics, made a study of the cost of production of castor beans on 34 farms in Mason and Case Counties*. These farmers produced castor beans under contract with the Commodity Credit Corporation. The average yield, using the Conner variety, was 602 pounds per acre. Hulled beans from the cooperating farms sold for an average price of $5.73 a hundred pounds. Mr. Wilcox, in summarizing his study makes this statement:

"It would seem that there is a place for castor beans on the light and sandy soils in Illinois if the price for beans in the hull is not below 3c a pound." It should be remembered that this crop was harvested by hand and if successful machine harvesting is developed, the cost of production (harvesting) will be reduced.

New Varieties

As previously stated many experiment stations cooperated in the government program of 1941 to 1943. Of those contacted during preparation of this report, most indicated that little interest existed after the discontinuance of the government program and because of a shortage of personnel the projects have for the most part been discontinued or at least put on an inactive basis.

Of those contacted the following indicated an active breeding program: (1) W. E. Domingo, division of tobacco, medicinal and special crops, Bureau of Plant Industry Station, Beltsville, Md., indicated that breeding investigations are being continued and that four new varieties have been produced. (2) E. V. Staker, Chemurgic Project, University of Nebraska, Lincoln, Nebr., is in charge of

*Investigations with the Castor Bean Plant.
I. Adaptation and variety Tests — JASA vol. 37, No. 9, Sept. 1945.
II. Rate of Planting and Date of Planting Tests — JASA vol. 37, No. 10, Oct. 1945.
III. Fertilizers, Clipping, Method of Planting and Time of Harvest, JASA vol. 37, No. 11, Nov. 1945.

*The cost of Producing Castor Beans in Illinois in 1943 by R. H. Wilcox, Ill. Farm Economics, No. 113, October 1944.

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BROKERS TO THE SOYBEAN PROCESSOR

the castor bean breeding program there. (3) Julian C. Miller, Experiment Station, Louisiana State University, Baton Rouge, La., has for a number of years been carrying on a breeding program. (4) The Illinois Agricultural Experiment Station at Urbana, Ill., is continuing their breeding program.

Conclusions

In summarizing the situation, it would seem that the reestablishment of the castor bean industry in the United States depends upon several factors:

First. How soon new varieties will be available which are high-yielding, non-shattering, resistant to diseases, and adapted to mechanized harvesting. It is pretty well agreed by those now actively working on breeding problems that the work has progressed far enough to predict that with time and effort expended, varieties superior to the present ones can be developed.

Second. How soon a mechanical harvester will become available. The Nebraska Chemurgic project has at the present time an engineer working with the Agricultural Engineering Department of the University towards developing a harvesting machine. This is a step forward in the right direction.

Third. Can the price of castor beans be maintained at a level which will permit the production with mechanized equipment? I shall not make a prediction on price, but with the price where it is at the present on imports, there is an active interest by industry to investigate possible home production. If mills are reestablished in the production areas it would seem that a favorable price relationship could be maintained.

Acknowledgment

The writers are deeply indebted to those who have responded to our inquiries. These contributions have added greatly to this report. Names of those contributing are listed.

H. A. Arnold, Dept. Agric. Eng., Agric. Exp. Sta., Knoxville 16, Tenn.

W. A. Bush, California Flaxseed Products Company, Los Angeles, Calif.

C. E. Claassen, Chemurgic Project, Agric. Exp. Sta., Lincoln, Nebr.

W. E. Domingo, Division of Tobacco, Medicinal & Special Crops, Bureau of Plant Industry Station, Beltsville, Md.

J. Edmond Good, Woburn Chemical Corporation, Harrison, N. J.

J. C. Kay, The Berkshire Chemical Co., Inc., Bridgeport 5, Conn.

A. S. Kohl, Spencer Kellogg & Sons, Buffalo 5, N. Y.

C. E. Lundell, Institute of Tech. & Plant Ind., Southern Methodist University, Dallas, Texas.

B. A. Madson, Division of Agronomy, University Farm, Davis, Calif.

John Matson, Pacific Castor Company, Hilo, Hawaii, T. H.

Julian C. Miller, Dept. of Hort., University of La., Baton Rouge 3, La.

G. H. Priest, Jr., National Paint, Varnish and Lacquer Assoc., Washington, D. C.

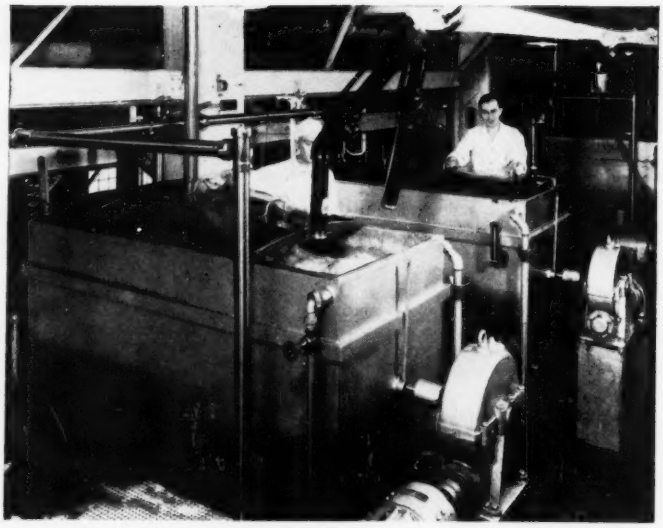
E. B. Reynolds, Division of Agronomy, Agric. Exp. Sta., College Station, Texas.

Victor Schoffelmayer, Dallas News, Dallas, Texas.

E. V. Staker, Chemurgic Project, Agric. Exp. Sta., Lincoln, Nebr.

John B. Washko, Dept. of Agronomy, Agric. Exp. Sta., Knoxville 16, Tenn.

A. P. Yerkes, International Harvester Co., Chicago, Ill.



Mixing vats in a margarine plant. For the first time in over 60 years margarine can be produced legally in Canada. It is still illegal to import margarine from foreign countries.

MARGARINE GOES ON SALE IN CANADA

Canadian manufacturers jumped into immediate production of margarine following the December 14 ruling by the Canadian Supreme Court throwing out the 62-year-old legal ban on margarine manufacture in that country.

Some margarine went on sale in Vancouver stores within a week after the ruling. It was said to look and taste like butter but it sold a lot cheaper.

The margarine law was passed in 1886. Since then, except for a brief period during World War I, margarine could not be manufactured or sold legally in Canada.

The Canadian Supreme Court outlawed the prohibition on manufacture, offer, sale or possession of butter substitutes; but retained the ban on importation of margarine from other countries. However, the average Canadian's chances of being able to buy margarine legally will be enhanced by the merger of Newfoundland with the dominion. Margarine is used extensively in that island. When the customs barriers between the two countries go down margarine can be shipped to other parts of Canada.

Typical of U. S. comment on the Canadian margarine ruling was the statement by Paul T. Truitt, president of the National Association of Margarine Manufacturers.

"It simply furnishes one more instance of the growing realization in Canada, the United States and elsewhere that anti-margarine laws are outmoded and were sought and maintained to prevent the butter industry from legitimate competition," said Truitt.

"Margarine is a perfectly good and nutritious food. Like other foods in this category, there is no reason for discriminatory legislation against it. Such legislation is not in the best interest of consumers and the public generally.

"The Canadian decision, indicating as it does the profound change in opinion with regard to margarine, makes me more hopeful than ever that the 81st session of Congress will repeal completely existing federal anti-margarine legislation."

Due to the Supreme Court ruling Canada at the present time is without any regulation on the manufacture or sale of margarine except the ban on importation.

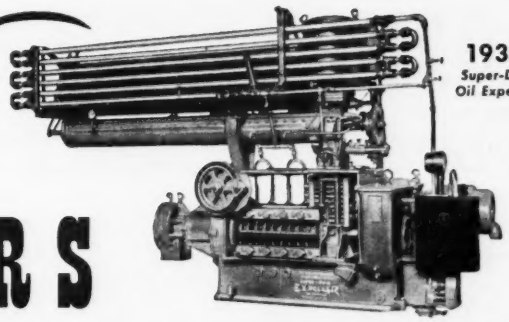
—s b d—

SOYBEAN EXHIBIT BY ILLINOIS FFA CHAPTER

A soybean product exhibit prepared by the Mt. Sterling, Ill., chapter of Future Farmers of America attracted the attention of thousands of people at the recent national F.F.A. convention in Kansas City.

Each state association of Future Farmers was asked to present an exhibit of some product representative of the agriculture of the state. Soybeans made an appropriate choice for Illinois.

H. L. Price, vocational agriculture instructor in the Mt. Sterling Community High School, and his chapter secured the materials and prepared them in an exhibit reported to compare very favorably with those from other states. Much of the material used was loaned by the American Soybean Association.



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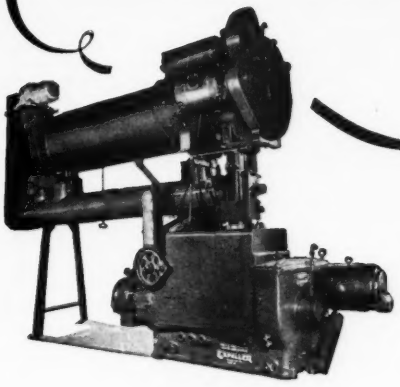

1949
Anderson Twin Motor
Super-Duo Oil Expeller

The two pictures show what has happened to Expellers in the last ten years. The 1949 Expeller is just about as different from a 1939 Expeller as a 1949 automobile is different from one of ten years ago. Anderson engineers conduct a continuous research resulting in decided and radical improvements in Expellers. These engineering improvements make for greater capacity, greater oil production, lower operating costs—all of which leads to greater profits with Expellers.

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ANDERSON EXPELLERS AND SOLVENT EXTRACTION EQUIPMENT

SOYBEAN OIL *in* Food Products

By WARREN H. GOSS

Member Soybean Research Council

AVERAGE annual consumption of prepared fats and oils for each person in the United States has risen from 34 pounds in 1890 to 46 pounds in the 5-year period of 1937-41. During World War II, this figure decreased because of shortages and, in the 1946-47 crop year, it was 42 pounds.

A major item in the human diet, fats and oils are consumed in the form of cooking fats, butter, margarine, salad oil, and the like, in addition to those which occur naturally in meat, milk, eggs and other foods.

Fats and oils may be classified in many ways. The most common is to designate whether they are of animal or vegetable origin. Soybean oil, a relatively new commodity in this country, now is our leading vegetable oil. It is obtained from soybeans, a crop which was imported from the Orient and which, after extensive modification by American plant breeders, has proved tremendously successful on farms of the Midwest. During the past few years, the production of soybeans in the United States has approached 200 million bushels per year, and each crop has yielded close to 1½ billion pounds of soybean oil.

Among the many reasons for the startling growth of soybean acreage is the requirement or, rather, the desperate need for fats to feed ourselves and the famished peoples of other countries whose normal supplies of edible oils and fats have been destroyed or disrupted by war.

Many predictions were made that the demand for soybean oil would decline with the end of the war, but there has been no such development; nor does such appear likely.

The advent of soybeans into American agriculture and industry has been both spectacular and dramatic, but no more so than are the operations employed routinely to harvest each crop, transport it to mills, and process the soybeans into oil and oil meal. Although the oil is utilized largely in making edible products, some is employed in the manufacture of paints, varnishes, linoleum, and other industrial products. The oil meal is a protein supplement of high quality which is consumed almost entirely in the preparation of livestock feeds. A sizable amount is processed specially to make soy flour and soy grits for human consumption.

The American soybean processing industry consists of about 150 mills, both large and small. These process about 75 to 85 percent of the crop, and the remainder is used for seed and miscellaneous purposes. Of the milling capacity, about 65 percent is what is known as screw presses, or the continuous pressure method. The oil is squeezed out while the ground and cooked beans are forced continuously under high pressure through a perforated steel cylinder. The other 35 percent of the capacity is more modern and consists of solvent extraction equipment. A solvent similar to gasoline is used to dissolve the oil out of the soybeans. With screw presses, the yield of oil is approximately 9 pounds per bushel of soybeans, and solvent extraction produces about 11 pounds.

Crude soybean oil is dark golden yellow and must be subjected to several complicated refining procedures before it is suitable for use as a food. The most important are, in chronological order:

1. Neutralization
2. Bleaching
3. Hydrogenation
4. Deodorization

Others are practiced in some cases. For example, certain processors recover a small amount of lecithin, a gummy emulsifying agent, from the crude oil prior to neutralization. Hydrogenation is omitted when a cooking oil is desired. To make a salad oil, it is necessary to omit the hydrogenation and to "winterize" the oil by chilling and filtering it before deodorization.

Why Refine

The purpose of refining edible oils is chiefly to remove undesirable materials which are present in very small proportions. Neutralization is a process of removing free fatty acids, whose presence causes finished oils to smoke when heated and to promote the deterioration of food products. The operation is accomplished by mixing the oil with lye, which converts the acids to soaps. These coagulate and are removed either by centrifuging or by allowing them to settle.

After removal of the acids, the oil is washed thoroughly with water in order to remove all traces of the soaps produced during neutralization. It then is dried by heating it sufficiently to evaporate any small traces of water that might be suspended within the oil. The next step is bleaching, which is the removal of most or all of the pigments and other colored materials present in crude oil. The elimination of these is effected by treating the oil with such materials as Fuller's earth and activated charcoal. In actual practice, the bleaching agent is suspended in the oil by vigorous stirring at an elevated temperature, often under vacuum, and then is removed by filtration.

Deodorization is employed to remove traces of materials which, if present, give the finished oil or fat an undesirable flavor and odor. The oil is subjected to steam distillation under a very high vacuum in order to reduce the concentration of these substances to a minimum.

In the preparation of salad and cooking oils, the oil is not hydrogenated, and deodorization is the final step. When the oil is used for manufacturing shortening and

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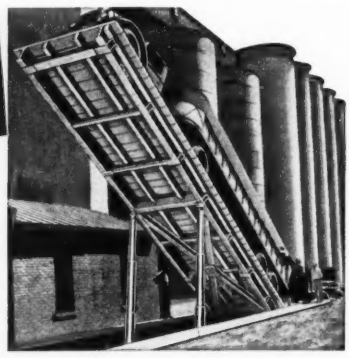

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WARREN H. GOSS

margarine, however, it is hydrogenated before deodorization. This is a process involving the addition of hydrogen to the individual molecules of oil in such a way that the resulting product is converted to a plastic fat instead of remaining a liquid oil. The process is carried out by bubbling hydrogen through the oil under pressure at a high temperature. In order to make the chemical reaction proceed in exactly the desired manner, finely divided nickel, prepared in a special manner, is suspended in the oil to act as a catalyst, or promoter of the reaction. It is removed subsequently by filtration.

Vegetable shortening is produced from soybean oil by neutralizing, bleaching, hydrogenating, deodorizing and, finally, whipping the product thoroughly with air or some inert gas in order to impart exactly the properties desired for its use in baked goods or other food products. Margarine is manufactured similarly, except that the final step consists in the incorporation of specially ripened milk, salt, vitamins, and other ingredients which, when properly mixed, constitute a delicious and nutritious product.

Food products made from fats and oils have become so familiar and have been major items in our diets for so long that we take them for granted and may fail to realize the enormous technological progress that has been made and the extent to which quality has been enhanced. An important share of this progress and improvement is due to the advent of soybean oil, a product of American farms.

—s b d—

The peanut marketing quota for 1949 has been set at 22 percent less than the average of the last 5 years by Secretary of Agriculture Brannan. If approved by two-thirds of the growers the marketing quota and peanut acreage allotments will go into effect next year.

PURINA AWARDS

Ralston Purina Co., St. Louis, Mo., will award up to seven $1,440 research fellowships annually to qualified graduate students beginning with the 1949-50 school year, the firm reports.

"The future progress of our great poultry, dairy and livestock industries, as well as that of other phases of agriculture, is dependent on the leadership of more and more competent, well-trained personnel," stated the company in its announcement.

"Realizing this need for a continuing number of qualified leaders, the Ralston Purina Co. will inaugurate a program of research fellowship awards."

Awards will be made in the fields of nutrition and physiology research as applied to dairy, poultry and animal husbandry; and research in transmissible diseases of livestock and poultry.

Individuals qualified for graduate study in land-grant agricultural colleges or approved veterinary colleges are eligible to make application for one of the awards.

Members of the Ralston Purina research award committee who will handle the program include Dr. R. M. Bethke, Ohio Agricultural Experiment Station; Dr. M. A. Emmerson, Iowa State College; Dr. K. L. Turk, Cornell University; Dr. W. M. Beeson, Purdue University; and Dr. C. A. Elvehjm, Wisconsin College of Agriculture.

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RECORD U.S.-WORLD SOYBEAN PRODUCTION

The 1948 soybean crop is estimated at 220,201,000 bushels—the largest of record, the U. S. Department of Agriculture reported in its annual crop summary December 17. This is the second time soybean production has exceeded 200 million bushels, the first being in 1946 when the crop totalled 201 million bushels. Last year production amounted to 183.6 million bushels while the 1937-46 average is only 134.6 million bushels.

The record production was brought about by exceptionally high yields since the acreage harvested for beans was about 8 percent less than a year ago. The U. S. yield of 21.4 bushels per acre is also an all time high, exceeding the previous record of 20.9 bushels per acre in 1939. Last year the yield was relatively low, 16.4 bushels, compared with the average of 18.8 bushels per acre.

The 11.7 million acres of soybeans planted alone for all purposes in 1948 was about 10 percent less than last year. The acreage interplanted with other crops, grown mostly in the Southern states, was also lower than a year ago—1.4 million acres, compared with 1.5 million acres in 1947. The interplanted acreage has been declining steadily for 10 years and has now reached the lowest level since 1935.

An exceptionally high percentage of the total soybean acreage was harvested for beans this year, about 83 percent for beans, compared to 82 percent in 1947. In the major producing North Central states, about 95 percent of the total acreage planted was harvested for beans, leaving only 5 percent for hay and other purposes.

The 1948 season was very favorable for soybeans. Most of the acreage was planted at about the optimum time. The growing and the harvesting seasons were also unusually favorable. Frosts caused practically no damage to the crop. Harvesting was delayed in some areas, especially in the Eastern states, because of wet weather, but no serious damage resulted. Combining was largely completed by December 1 in the major producing areas. The quality of the crop is very good with many of the beans having an unusually low moisture content.

SOYBEANS FOR BEANS

State	Acreage harvested* Average 1937-46	Acreage harvested* 1947	Acreage harvested* 1948	Yield per acre Average 1937-46	Yield per acre 1947	Yield per acre 1948	Production Average 1937-46	Production 1947	Production 1948
	Thousand acres			Bushels			Thousand bushels		
N. Y.	10	5	5	14.9	15.0	16.0	154	75	80
N. J.	**10	10	11	**15.3	17.0	16.5	**144	170	182
Penna.	21	17	16	15.4	16.0	16.0	315	272	256
Ohio	766	950	908	19.4	18.5	20.5	14,843	17,575	18,614
Ind.	1,012	1,503	1,451	18.0	18.5	21.5	18,486	27,806	31,196
Ill.	2,624	3,636	3,271	21.4	18.0	24.0	55,896	65,448	78,504
Mich.	85	76	65	16.0	17.0	17.5	1,358	1,292	1,138
Wis.	32	26	15	14.5	13.0	13.0	449	338	195
Minn.	202	920	844	14.9	15.0	18.5	3,086	13,800	15,614
Iowa	1,180	1,884	1,541	19.8	15.5	23.0	23,406	29,202	35,443
Mo.	357	825	795	14.2	12.0	20.0	5,608	9,900	15,900
N. Dak.	**5	6	7	**10.8	10.0	13.0	**59	60	91
S. Dak.	**11	50	31	**13.9	11.5	18.0	**156	575	558
Nebr.	**22	32	23	**14.5	14.5	22.0	**323	464	506
Kans.	117	222	167	10.6	8.5	15.0	1,285	1,887	2,505
Del.	30	42	41	13.0	13.0	12.5	388	546	512
Md.	25	34	33	13.5	13.0	15.5	340	442	512
Va.	63	95	106	14.3	15.0	16.5	902	1,425	1,749
W. Va.	1	1	1	12.6	14.0	13.5	14	14	14
N. C.	203	233	264	11.5	15.0	13.5	2,333	3,495	3,564
S. C.	11	17	22	7.2	10.0	10.0	84	170	220
Ga.	12	14	15	6.4	7.0	7.5	75	98	112
Ky.	50	100	121	14.0	17.5	19.0	729	1,750	2,299
Tenn.	35	60	67	11.5	15.5	20.0	447	930	1,340
Ala.	20	41	51	8.9	18.0	19.0	200	738	969
Miss.	72	95	133	11.3	14.0	18.0	885	1,330	2,394
Ark.	158	283	264	14.0	12.0	19.5	2,296	3,396	5,148
La.	25	24	35	12.6	12.5	14.0	314	300	490
Okla.	5	11	8	7.1	5.5	12.0	34	60	96
U. S.	7,162	11,212	10,311	18.8	16.4	21.4	134,642	183,558	220,201

*Equivalent solid acreage. (Acreage grown alone, with an allowance for acreage grown with other crops.) **Short-time average.

The North Central states alone produced more than 200 million bushels of soybeans, all but about 20 million bushels of the U. S. total. The high production in this area was brought about by a bumper yield of 22.0 bushels per acre. The same area last year had a yield of only 16.6 bushels per acre. All of the states of the area had yields above average except Wisconsin, where soybeans have been declining in popularity for several years. Illinois, the largest producing state, had the highest yield per acre—24.0 bushels, compared with only 18.5 in 1947. Iowa, the second largest producing state, likewise had the second highest yield—23 bushels per acre.

The South Atlantic states as a group had slightly lower yields than in 1947. North Carolina, the largest producing state of the area, had an exceptional year in 1947 with near record yields, but this year the crop was damaged by a dry period early in the season and a wet period in early October. The 13.5 bushel yield this year is one and one-half bushels less than in 1947.

The South Central states had record yields in several states and a very high yield of 18.8 bushels per acre for the area. This is far above the 13.9 bushels per acre produced in 1947. Each state of the area shows gains in production, with Arkansas reporting the largest increase. Production in Kentucky, Tennessee and Mississippi also registered sharp gains over 1947.

(Continued on page 34)

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SOYBEAN CROP

(Continued from page 32)

World Production

Indications point to a new record in world soybean production. A preliminary estimate of the Office of Foreign Agricultural Relations places the 1948 output at approximately 575 million bushels. The revised estimate for 1947 is 503.3 million bushels. The United States, the second largest producer, and Canada harvested record crops. Increases over 1947 also occurred in China, the principal producer, and in a number of other countries. On the other hand, the Manchurian crop is smaller.

Canadian farmers have harvested their largest soybean crop. The November estimate was 1.7 million bushels of soybeans from 94,000 acres compared with 1.1 million bushels (revised) and 61,000 acres in 1947. Ontario is the only province reporting commercial production at this time.

The Canadian government is desirous of increasing soybean production sufficiently to replace imports of edible oils. The Ontario Agricultural College has done considerable extension work with farmers in promoting soybean culture.

During the 1947-48 crop year (August-July) Canada imported 1,075,000 bushels of soybeans, 5,876,200 pounds of oil (653,000 bushels in terms of beans), 2,800,000 pounds of soybean flour, and 24,200,000 pounds of cake and meal, all from the United States with the exception of a few beans from China. Soybean prices at Toronto were around $2.25 per bushel in October, $1.00 less than a year earlier.

United States 1948 soybean production, estimated at 210.5 million bushels on November 1, is a record for this country, surpassing the previous peak output (1946) by almost 5 percent and the 1947 outturn by 16 percent. This year's soybean crop was harvested from 9.9 million acres, more than 1 million less than in 1947, but the yield of 21.3 bushels per acre was the highest yet attained. Illinois with a yield of 24 bushels accounted for well over a third of the total. Indiana and Iowa also had exceptionally large yields.

The 1948 soybean production in European countries appears to have been negligible. Hungary reports a crop of 90,000 bushels, 11 percent above that of 1947. Italian soybean production was only 103,000 bushels compared with 150,000 last year.

According to recent information, Asiatic soybean crops are larger than in recent years but not equal to prewar output except in China and Turkey.

China's 1948 soybean crop of 210.8 million bushels is the largest since the middle 1930's,

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despite a 3-percent acreage reduction from 1947. China (excluding Manchuria) is the world's largest soybean producer and consumes the greatest quantity as food or in the preparation of food products.

The 1948 estimate for Manchurian soybean output is not available. It seems quite likely, however, that production will be less than the small harvest of 119 million bushels a year ago. There has been a tendency to divert to food grain land normally planted to soybeans chiefly because of the difficulty in marketing the beans. Typhoon and floods in some parts of the country probably reduced the crop.

Exports of soybeans and products in terms of beans totaled only 532,000 bushels during the crop year (October-September) 1947-48 compared with 103,069,000 during the 5 years ending September 1939.

Japanese soybean production has increased annually since 1945 but has not reached the prewar average. The 1948 estimate of 8.7 million bushels is 1.6 million bushels larger than in 1947.

Soybean production in South Korea showed a marked increase in 1948. The preliminary forecast is 9.3 million bushels against 4.9 million last year. The crop produced in this part of Korea is now utilized within the country. It is estimated that about 40 percent is consumed on farms and a large percentage is used to manufacture soya sauce, paste, and other edible products.

Netherland's Indies (Java) soybean production has gradually recovered from the low output of 2.2 million bushels in 1945, and the 1948 crop is estimated at 7.7 million or only 20 percent less than the 1935-39 average. A larger crop was anticipated but drought reduced the yield in some areas and several thousand acres were destroyed by rodents. No exportable surplus will be available from the current crop.

Turkey has increased soybean production during the past 2 years. The 1948 forecast is 70,000 bushels compared with 55,000 last year and 16,000 in 1946. Apparently soybeans are grown chiefly for export since 36,000 bushels were shipped during January-May 1948, and 18,000 bushels in 1947.

Brazil has grown soybeans for more than a decade, but production was negligible until the past 2 years when there was a marked increase, especially in Rio Grande do Sul. The 1948 crop for all Brazil is estimated at 690,000 bushels compared with 480,000 in 1947 and 147,000 in 1946.

Only 2 countries in Africa appear interested in growing soybeans. Tanganyika's production amounted to 15,000 bushels in 1946, then dropped to 8,000 the following year but rose to 53,000 in 1948. Of this year's crop 35,000 bushels have been designated for export, probably to the United Kingdom.

Soybean production in the Union of South Africa has not been reported for 1948. In 1947, however, the output was 933,000 bushels compared with 56,000 a year earlier, which indicates an increasing interest in the crop.

Cultivation of soybeans in Australia is still in the experimental stage and is confined to certain districts in New South Wales and Queensland where production totaled only 500 bushels in the 1947-48 crop year.

—s b d—

BEST PLANTING DATE

Early varieties of soybeans, say plant breeders of the U. S. Department of Agriculture, are really better described as short-season varieties—those that require a relatively small number of days to ripen their seeds. Farmers who need a soybean that matures early must plant an *early variety*—and, furthermore, says the department, *they must plant it early.*

Tests made by the Department and the Missouri Agricultural Experiment Station on five varieties of soybeans, early and late ones, brought out this and a number of other facts.

The tests showed that early planting of full season varieties advances the maturity date only slightly. In other words, such soybeans will use nearly all the time given them up to their regular time of ripening. Ripening is determined by the inherited tendency to harden off the beans when the length of day reaches a certain point.

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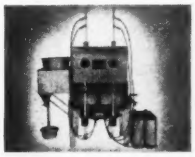

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Publications

COCOA SEEN AS NEW FIELD FOR SOY

A likely field for soy is as an ingredient in cocoa, reports Dr. William Bening of Germany. He states that about 15 years ago a leading chocolate firm in Vienna produced a cocoa made mostly from the soybean. It was sold largely for use in hospitals.

Ground cocoa, deprived of its oil content, was mixed with a far greater percentage of ground soybean. With water added, it produced a drink like that of cocoa mixed with milk. It was found to be very nourishing and satisfying.

The value of soy in cocoa lies in its high albumen content. Cocoa itself is deficient in albumen. The purpose of the soy is not to crowd out the milk chocolate but to furnish a very nourishing addition.

Soybeans were also being used as a substitute for nuts in candy in Germany before the war, according to Dr. Bening. The soybean was found to be an especially fine substitute for almonds.

COCOA AND SOYBEANS. By Dr. William Bening. Frankfurt on the Main. *Revue Internationale de la Chocolaterie.*

FOODS

Heat and Soy Grits

When soy grits are added to recipes they should be cooked from 15 to 30 minutes to obtain the utmost in value from their proteins. This is true of grits obtained by both the screw press and extraction process even though both employ heat in their manufacture, report researchers in the Bureau of Human Nutrition and Agricultural Economics, of the U. S. Department of Agriculture.

It has been known for some years that moist heat will convert the protein of raw soybeans from a form that has low nutritive value to one that approaches the proteins of animal origin. However, the Bureau has found that rats receiving 15 parts soy flakes combined with 85 parts oatmeal that had been cooked in a double boiler as a breakfast cereal grew considerably more than a similar group of animals fed the same mixture uncooked.

Because of this finding, a systematic study of the effect of common cooking procedures on the nutritive value of processed soy products was undertaken. Finely ground soy grits were used. Both baking and boiling increased the protein efficiency of the grits.

The results suggest that in preparing recipes using soy products the soya should be added when possible when cooking is to continue for 15 to 30 minutes, rather than at the end of the cooking period, as is often recommended. Cooking up to 60 minutes resulted in large losses of thiamine.

EFFECT OF COOKING ON SOME NUTRIENTS IN SOY GRITS. By Elizabeth Crofts Callison, Janet E. Bear and Elsa Orent-Keiles; Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, Beltsville, Md. *Journal of the American Dietetic Association*, Chicago, Ill., Nov. 1948.

Canned Soybeans

Unblanched soybeans lose far less of their ascorbic acid than do blanched soybeans when home-canned, according to workers at the Washington station. The unblanched beans also lose less of their thiamine, according to these workers. They compared two methods of home canning on the ascorbic acid and thiamine contents of peas, snap beans, and Lima beans as well as soybeans. The Bansei variety of soybeans was used.

In the first method of canning the vegetables were blanched for 5 minutes in boiling water and packed hot in jars.

In the second, they were packed unblanched in pint jars, covered with boiling water, exhausted for 10 minutes in the pressure cooker and processed.

Except for Lima beans, all the unblanched products retained their ascorbic acid better than did the blanched products. Unblanched soybeans retained 93 percent of their ascorbic acid compared to 30 percent less for the unblanched soybeans.

Results on loss of thiamine were more variable, with soybeans losing far more of their thiamine by canning than did the other legumes. This was probably due to the longer canning time soybeans require.

In freezing studies, it has been observed that smaller leaching losses occurred with soybeans than with other vegetables.

EFFECT OF CANNING ON THE ASCORBIC ACID AND THIAMIN IN VEGETABLES. By C. L. Bedford and Margaret A. McGregor, divisions of horticulture and home economics, Agricultural Experiment Station, State College of Washington, Pullman. *Journal of the American Dietetic Association*, Chicago, Ill., Oct. 1948.

Legumes and Heat

It is generally known that the food value of soy protein is improved by heating. The fact that it is heated is one of the advantages soybean oil meal has over raw soybeans. But soybeans apparently are not alone in this respect. The proteins of other legumes also are improved by heat treatment, Texas research workers have found.

Lima beans, pinto beans, English peas and Southern peas, which are important sources of food in the South, were compared with casein and egg albumin as sources of protein for the growth of rats.

The legumes were tested raw and after they had been autoclaved at 15 pounds pressure for 30 minutes. All legumes were improved as sources of protein by the heat. The nutritive values of all legumes were also increased by the addition of 0.2 per-

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cent of methionine if the legume was heated before the methionine was added.

SOUTHERN PEAS AND OTHER LEGUME SEEDS AS A SOURCE OF PROTEIN FOR THE GROWTH OF RATS. By L. R. Richardson, department of biochemistry and nutrition, Agricultural and Mechanical College of Texas, College Station. *Journal of Nutrition*, Philadelphia, Pa., Oct. 11, 1948.

In Institutions

Experimental work on soybeans and soy products was done at Michigan State College during the war to test their acceptability in institution food service. (This was covered in Michigan *Circ. Bul. 204* previously reviewed.)

All of the dishes were well accepted except those made with dry soybeans, which the author believes will never be very popular in the U. S. due to their high fat content.

The use in institutions of dry and green soybeans, soy flour and grits, soy butter, milk and sprouts is described in this article.

Many institutions are interested in inexpensive protein dishes for budgetary reasons. As soybeans and soy products not only provide such a source but add to the mineral and vitamin content of the diet as well, it would seem that they merit consideration.

SOYBEANS IN PEACE OR WAR. By Mabelle S. Ehlers, professor and head, department of institution administration, Michigan State College, in *Modern Hospital*, July 1948.

Food Allergies

Many infants are allergic to both human and cow's milk and present a very real problem in feeding. Most allergists and pediatricians feel that the best substitute for these allergic infants is soy milk.

However, a case has been reported of a death of a 6-day-old baby that was apparently allergic to all protein including soy protein, which was fed him.

FOOD ALLERGY. Carl B. Kelvin, M.D., and Robert A. Schless, M.D., Philadelphia, Pa., in *Journal of Pediatrics*, St. Louis, Mo., Oct. 1948.

Lecithin

Utilization of vitamin A and carotene in the diet is rather small due to poor absorption and destruction, according to several investigators. Their destruction can be partially stopped by eating at the same time certain fats and oils containing fat-soluble antioxidants.

Lecithin is said to contain an unknown factor that influences carotene and vitamin A utilization in the rat.

A series of three experiments were undertaken at the Ohio Agricultural Experiment Station to study the effects of crude soya lecithin and choline on the absorption, utilization and storage of vitamin A in laboratory rats.

The results indicate that lecithin enhances both the absorption and utilization of vitamin A and carotene. The choline fraction of the lecithin molecule is not responsible for the action, however.

THE EFFECTS OF SOYA LECITHIN ON THE ABSORPTION, UTILIZATION AND STORAGE OF VITAMIN A AND CAROTENE IN THE WHITE RAT. By G. C. Esh and T. S. Sutton. *Journal of Nutrition*, Sept. 1948.

FEEDING

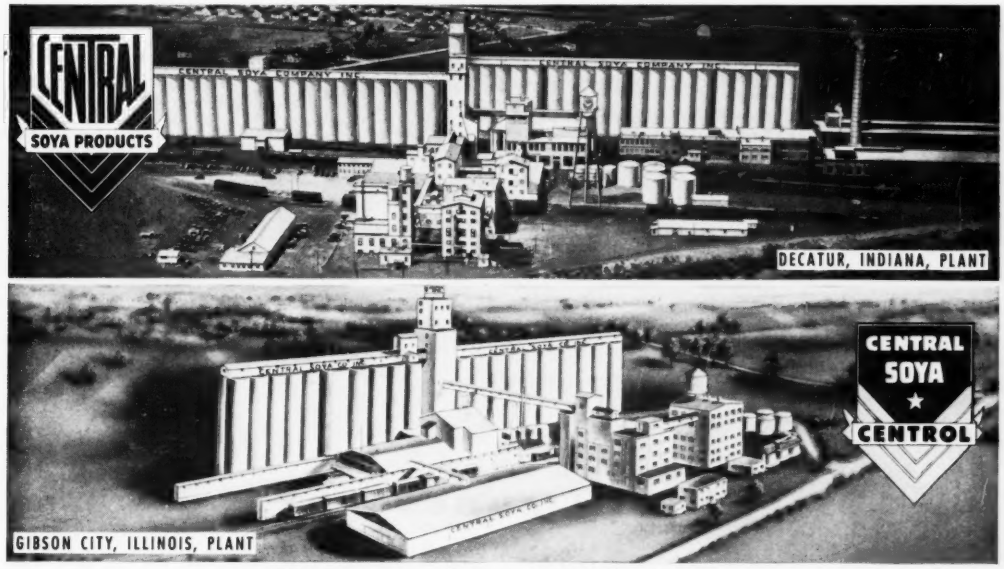
Wood Yeast

Wood yeast is a satisfactory protein supplement for dairy cows, research workers at the University of New Hampshire say. In fact, their tests indicate that wood yeast is equal to high quality soybean oil meal as a source of protein for the production of milk by cows.

Recently a test was carried out on the Guernsey herd of Rosewald Farm, Hillsboro, N. H., where wood yeast was compared with soybean oil meal as the protein supplement in the grain ration.

One group of cows was continued on the standard grain ration then in use and which contained 12½ percent soybean oil meal. The other received the same ration but with the soybean oil meal replaced by an equal amount of wood yeast.

Rations were reversed for each group at



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the end of 4 weeks and the tests were continued for another 4 weeks. Only six animals were used. The average yield of milk per pound of grain consumed by all cows was the same on the yeast as on the soybean oil meal ration.

WOOD YEAST AS A PROTEIN SUPPLEMENT. By E. G. Ritzman, research professor emeritus, University of New Hampshire. *Guernsey Breeders' Journal*., Nov. 15, 1948.

Lamb Feeding

Comparisons over a 3-year period have been made at the New York Experiment Station with various high-protein feeds as supplements to corn silage and shelled corn in feeding fattening lambs.

Corn silage was the only roughage except for small amounts of hay allowed when starting the lambs on feed. Shelled corn constituted the grain feed, ground limestone was used, salt was offered free choice and fresh water at all times.

The protein feeds used were linseed meal, soybean oil meal, whole soybeans, corn gluten feed, distillers' corn dried grains and brewers' dried grains. The lambs had an initial average weight of between 55 and 60 pounds, and were fed about 3½ months.

There were no significant differences in the rate of gain and feed requirements of the different groups. All groups fattened well and carried about the same degree of finish at the close of the test.

The soybean oil meal group of lambs was very efficient for the amount of protein feed required per 100 pounds of gain. They needed only 76.7 pounds of meal as compared with 97.9 pounds for the linseed meal group. However, the corn requirement for the soybean lambs was almost 300 pounds as compared with a little over 276 pounds for the linseed lambs.

The average daily feed consumed per head for the soybean oil meal lambs was about 1 pound of shelled corn, 3¼ pounds of corn silage and a little over ¼ pound of soybean oil meal.

The investigators note that the linseed meal lambs were easier to keep on feed than any of the other groups.

THOSE NICE FAT LAMBS. By R. W. Duck. *Rural New Yorker*. Oct. 2, 1948.

DRYING OILS

Soya-Tung Oil

A 60-40 soya-tung oil combination cobodied at 550° F. gives better drying and hardness than a bodied linseed oil of equivalent viscosity, according to a recent research. The Pittsburgh Club has now carried on a study to evaluate a narrower range of proportions of the two oils.

Following are some of the conclusions reached:

1. Soya-tung oil in a 67:33 ratio dries at approximately the same rate as a bodied linseed oil of the same viscosity. In varnishes it shows slightly slower drying to somewhat lower hardness than similar linseed varnishes.

2. The varnishes prepared from linseed oil and soya-tung oil were practically identical in water resistance.

3. All of the soya-tung oil varnishes investigated are free from gas checking.

4. Prebodying of the soya oil before cobodying with the tung oil definitely improves the drying of the oil.

A STUDY OF SOYA-TUNG OIL. By the Pittsburgh Club. *Paint Oil and Chemical Review*, Chicago, Ill. Nov. 11, 1948.

MISCELLANEOUS

Fertilizers Pay

Low yields of soybeans discourage growers in the Southeastern states. Average yield in North Carolina during the years 1943-47 was only 12.1 bushels per acre which is far from profitable.

But North Carolina yields can be boosted to between 30 and 40 bushels an acre by proper production practices, according to W. L. Nelson and E. E. Hartwig.

The practices they recommend to bring soybean yields in the Southeast up to a profitable level are:

1. Lime the soil with dolomitic limestone in accordance with requirements as shown by soil tests.

2. Fertilize with adequate amounts of potash and phosphorus.

3. Plant and secure a good stand of an adapted variety.

Nelson and Hartwig have proved that these are the steps to take to get good yields by tests carried out at the North Carolina station.

PROFITABLE SOYBEAN YIELDS IN THE SOUTHEAST. By W. L. Nelson and E. E. Hartwig in *Crops and Soils*, Nov. 1948.

Moisture in Lecithin

The Karl Fischer reagent has been employed in the development of an accurate and rapid method for the determination of moisture in lecithin. Difficulties presented by previous methods for this determination have been entirely eliminated. The method is also applicable to related materials such as crude and refined corn and soybean oils.

DETERMINATION OF MOISTURE IN LECITHIN AND CRUDE SOYBEAN OILS. By K. M. Brobst, A. E. Staley Manufacturing Co., Decatur, Ill. *Analytical Chemistry*, Oct. 1948.

POYLMER FRACTIONATION OF HEAT POLYMERIZED NON-CONJUGATED VEGETABLE OILS. By I. M. Bernstein, *Journal Physics and Colloid Chemistry*. 52, 613-61 (1948).

Correction

An abstract of an article, "Peanut Protein Paper Coatings," by Jett C. Arthur, T. W. Mason, Jr. and Mabelle E. Adams was published in the November issue of *Soybean Digest* and wrongly attributed to *Oil and Gas Journal*.

The article actually appeared in *Journal of the American Oil Chemists' Society* and should have been credited to that publication.

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GRITS and FLAKES... FROM THE WORLD OF SOY

Earl Dean was reelected president of the North Iowa Cooperative Processing Association, Manly, Iowa, at its annual meeting December 6. Also reelected: M. G. Fabricius, Osage, vice president; Earl L. Dickinson, Mason City, secretary-treasurer; and directors Eler Apel, Nora Springs; J. W. Reding, Stacyville; N. K. Anderson, Thompson and C. D Daniels, Garner.

* * * *

Buffalo Solvents & Chemicals Co., Buffalo, N. Y., has been appointed sales representative for the chemical division of General Mills, Inc. The firm will handle the complete General Mills line of fats and oils and organic chemical derivatives for the technical trade.

* * * *

Directors of St. Regis Paper Co. announce that Roy K. Ferguson will assume the position of chairman of the board, which has been vacant, and continue to act as president. James H. Allen, president of two of the company's subsidiaries, has been named to the newly created post of vice chairman of the board.

* * * *

W. E. Powell has been appointed assistant sales manager at the Memphis plant of Bemis Bro. Bag Co. He started with Bemis as office boy in Memphis in 1921. Powell served with the Army Air Force during World War II.

* * * *

Benton R. Cancell and William R. Adams have been appointed vice presidents of St. Regis Paper Co., succeeding Carl B. Martin and Lyman A. Beeman, who have resigned. Cancell is general manager of manufacturing of the printing, publication and converting paper division; and Adams is in charge of production of certain of the company's kraft paper mills. Both Martin and Beeman will remain with the company in an advisory capacity.

* * * *

Dr. George E. Ziegler and Dr. Clayton O. Dohrenwend have been appointed director and assistant director of the Midwest Research Institute in Kansas City, Mo. Ziegler came with the Institute at its inception in 1945. He has been acting chief administrator. Dohrenwend joined the Institute in 1946.

* * * *

"American Agriculture in World Affairs" is the topic for the 11th annual National Farm Institute to be held at Hotel Fort Des Moines, Des Moines, Iowa, February 18 and 19. The Institute originated in 1937, is sponsored by the Des Moines Chamber of Commerce.

* * * *

A. G. Hopkins, president of Mrs. Tuckers Foods, Sherman, Texas, and of Southland Cotton Oil Co., has been elected to the board of directors of M-K-T Railway Co.

* * * *

Swift & Co. soybean mill in Des Moines, Iowa, was host at a recent meeting of Polk

SEEDBURO ELECTS

A. O. SEEHAFER

Seedburo Equipment Co., Chicago, Ill., has announced the election of A. O. Seehafer to a vice presidency. Mr. Seehafer will be responsible for technical improvement, product research, and development of new applications for the many equipment and supply items in the Seedburo line. Since joining Seedburo earlier this year, Mr. Seehafer has worked extensively on new applications and refinements of the widely used Steinlite moisture tester in the grain and seed trades and related fields. His extensive background in engineering well qualifies him for the responsibilities he has assumed. He has for 15 years been associated with two leading industrial concerns in product engineering and sales development capacities.

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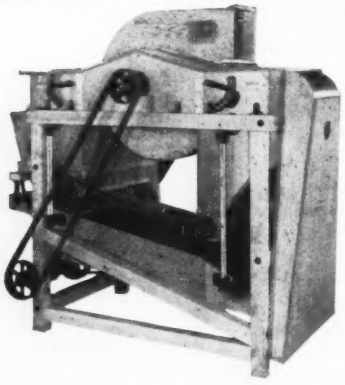

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County Elevator Association. Manager E. C. McGee acted as master of ceremonies at a dinner at Curley's restaurant after the regular business meeting.

* * * *

Hugh Hale, Royal, Iowa, country elevator operator, has been appointed chairman of the national country elevator committee of the Feed Dealers National Association. He succeeds Elton Kile, Kileville, Ohio, who has been transferred to the national legislative committee at his own request.

* * * *

Matt Walsh and his son, Shelley, have organized the Walsh Grain Co., Inc., with headquarters in Flour Exchange Bldg., Minneapolis. The senior Walsh was grain merchandiser for Archer-Daniels-Midland Co. for 21 years. Shelley was a vice president of Mullin & Dillon Co.

* * * *

Construction of a margarine and mayonnaise plant for Durkee Famous Foods at Macon, Ga., has been begun by Rust Engineering Co., Birmingham, Ala.

* * * *

Asa F. Seay, vice president of Ralston Purina Co., St. Louis, has given $85,000 to the National Benevolent Association of the Christian Church to establish a children's home in memory of his wife who died last July. Seay has been president of the Association for 15 years.

* * * *

Robert J. Keith, director of advertising, Pillsbury Mills, Inc., was elected to the board of directors of the Association of National Advertisers in New York.

* * * *

R. G. Bullock is the new sales manager for Chase Bag Co. in Milwaukee. He had been the Chase representative at Denver, Colo.

* * * *

A bulletin describing Dings "High Intensity Perma-Plate Alnico" magnets for removal of harmful tramp iron from food and other materials has been issued by Dings Magnetic Separator Co., 4740 W. McGeogh Ave., Milwaukee 14, Wis.

* * * *

Copies of "Allis-Chalmers Switchgear and Control Devices," a 16-page guide, are available from Allis-Chalmers Manufacturing Co., S. 70th St., Milwaukee, Wis.

* * * *

"Countercurrent Liquid-Solid Extraction," an account of the Kennedy continuous pilot plant, was an article by Frank Lerman, Angus B. Kennedy and Jerome Loshin, Vulcan Copper & Supply Co., Cincinnati, Ohio, in September 1948 *Industrial and Engineering Chemistry*.

* * * *

John S. Pillsbury, chairman of the board of Pillsbury Mills, Inc., Minneapolis, was honored by Minneapolis business leaders at a banquet on his 70th birthday Dec. 6.

* * * *

A new line of permanent magnetic drum separators is described in a bulletin published by the Eriez Manufacturing Co., Erie, Pa.

* * * *

Allied Mills' new 8-story concrete grain elevator and feed mill at Fort Wayne, Ind., is nearing completion. The building will double the manufacturing capacity of the plant, according to W. O. Seibert, manager.

* * * *

H. V. Nootbar & Co., Pasadena, Calif., brokerage firm, has moved to new offices. A

DIXIE APPOINTMENT

DAVID P. SWAN

David P. Swan has joined the staff of Dixie Machinery Manufacturing Co., in the capacity of field engineer and to assist in general sales promotion, President Elmer W. Noxon has announced.

Formerly connected with the Gruendler Crusher and Pulverizer Co., Swan has an extensive background in the feed milling industry, including experience covering design and construction of entire plants as well as the specialized adaptation of grinding and pulverizing equipment.

Noxon has also announced that as part of Dixie's contemplated expansion program, plans are under consideration for the installation of a testing laboratory to be erected at the plant. This will enable the company to engage in further research into problems confronting the rapidly expanding feed milling and industrial grinding field.

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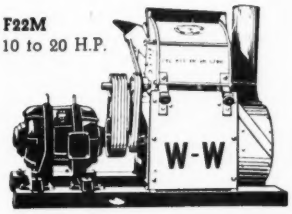
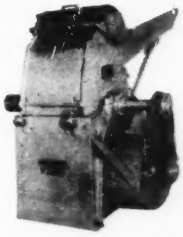


Feed opening 18" wide and a perfect pulverizer as well as coarse grinder. For small feed plants will quickly pay for itself in low grinding costs.

F25M
25 to 40 H.P.



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50 to 75 H.P.
Shaft 4¾"

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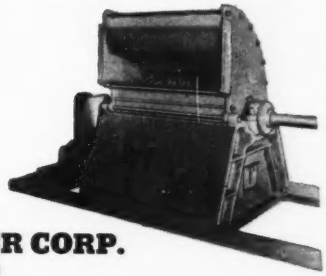

F29M
100 to 150 H.P.
Shaft 4¾"

MAIN BEARINGS
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AT 3600 R.P.M.
35" WIDE

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warehouse was modernized and converted into two suites of offices, and lunch and recreational rooms.

* * * *

Fred E. Alsop Co. has opened new offices at 935 N. W. 12th Ave., Portland 9, Ore. Alsop represents the soya products division of the Glidden Co., among other firms.

* * * *

Chemical plants division of Blaw-Knox Co., Pittsburgh, Pa., has announced the promotion of E. S. Wright to manager of construction and W. F. O'Neill to succeed Wright as general superintendent of construction. Wright has been active in every phase of the division's construction activities. O'Neill supervised building of Blaw-Knox radio towers on Saipan for broadcasting OWI messages to Japan during the war.

* * * *

Clifford L. Denker became manager of Weston Grain Co., Weston, Ill., effective January 1. He has been assistant manager of Towanda Grain Co., Towanda, Ill.

* * * *

The Circleville, Ohio, plant of Ralston Purina Co. recently was awarded the Liberty Mutual Insurance Co. accident prevention flag in recognition of its record of operating 501,632 man-hours from September 1, 1946 to November 15, 1948 without a lost-time accident.

* * * *

Phil A. Grotevant, 64, Harvey, Ill., representative for S. Howes Co., died December 11 from a heart attack. He was in the grain, elevator and equipment business all his life. He had been with Howes since 1940, and had represented Sutton, Steele & Steele.

* * * *

Richard C. Danielsen, Clinton, Iowa, has been appointed general traffic manager of the feed and soy division, Pillsbury Mills, Inc. He will be in charge of traffic activities for the entire division.

* * * *

C. G. Carter, Memphis, Tenn., cottonseed and soybean broker, has been recuperating from a broken leg suffered in a fall at his home.

* * * *

Russell B. Maas was elected general manager and treasurer of Screw Conveyor Corp. at a recent meeting of the board of directors. Maas is a former vice president and one of the founders of the corporation. Henry Cleveland was elected a vice president.

* * * *

The Northern Illinois Processing Co., Poplar Grove, Ill., has leased its soybean processing plant to the Sullivan Grain Co. of Sullivan, Ill. The plant will be used for corn drying.

* * * *

Earl Pack, former assistant manager of the Farmers Grain Co., at Palmer, Ill., is now in charge of the Shellabarger Grain Co., at Pana, Ill.

* * * *

Formal opening of the new building of the Fayette, Iowa, Soybean Mill was December 8. Charles and C. J. Halverson are owners and L. A. Rose is manager of the mill.

* * * *

Fire of unknown cause recently destroyed the Federal-North Iowa Grain Co. elevator with a loss estimated at $200,000 including 40,000 bushels of soybeans.

* * * *

Link Belt Co. announces that R. E. Whinnery, formerly superintendent, has been appointed to the newly created position of assistant general manager of the Link-Belt Dodge plant in Indianapolis; and that L. C. Heinlein, formerly assistant superintendent, has been appointed superintendent.

MINNEAPOLIS MANAGER

The appointment of John T. Braxtan as office manager of its Minneapolis plant has been announced by Bemis Bro. Bag Co. He was formerly with the Company's general offices in St. Louis as supervisor of burlap sales. Mr. Braxtan joined the Bemis Co. in 1934 at St. Louis, and in 1941 was placed in charge of the market research department. During World War II he served as a lieutenant commander in the Navy. Upon his return to Bemis he worked on a number of special assignments prior to being put in supervision of burlap sales.

— s b d —

'49 SOYBEAN PROSPECTS

Soybeans will probably continue in strong demand in 1949, economists of the U. S. Department of Agriculture believe. For the years further ahead, the prospect is not so clear.

Soybeans are so new as a major crop in this country that there's little past experience to judge by. The developments a few years before the war were just a good running start for the remarkable expansion in soybean growing during the war.

Looking ahead, the economists don't see any revolutionary changes.

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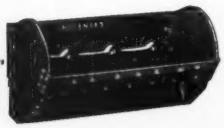

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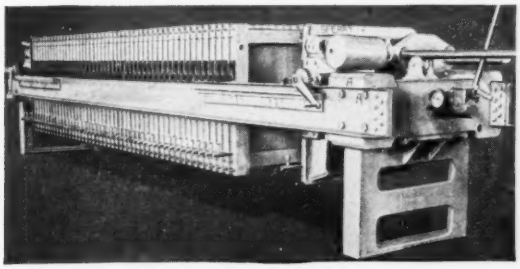

WASHINGTON Digest

By PORTER M. HEDGE

Washington Correspondent for The Soybean Digest

Here's CCC Policy The commodity markets received the recent news of Commodity Credit Corporation's so-called "change" in domestic sales policy with unwarranted pessimism.

This, at least, is the way USDA officials view it. The "new" policy simply said:

That Commodity Credit can't sell domestically for less than the lowest of three prices: (1) cost, (2) 90 percent of parity price, (3) halfway between the support price level and parity.

All this does, officials say, is to move forward to 1949 a Congressional directive which was to take effect in 1950. Had this not been done, there would have been no legislative restriction on Commodity Credit this year—*if* it were to sell on the domestic markets.

Commodity markets generally interpreted the announcement to indicate CCC was getting ready to set up a bargain counter.

Officials say this is a misunderstanding. They say CCC purchases and sales will go on as usual; that CCC will buy only to fill export requirements, except in direct price support operations.

Officials say the CCC announcement probably did have a depressing effect on soybean prices, but that it was unwarranted. They point out that soybeans actually are in short supply, and there is an export market for more beans than the U. S. can supply.

Flax is in a different category. Flax purchases have been for price support. So far about 20 million bushels have been accumulated by CCC.

Up to 10 million bushels of flax probably will be exported. While policy isn't settled, the remainder of CCC holdings probably will be stockpiled, as insurance against a short crop or a worsening European situation.

Supply of Meals A new export allocation of oilseed meals, covering the first quarter of 1949, is to be announced some time this month.

It will include re-allocation of the quantity allotted for export during the last quarter of 1948, but not actually shipped. It's also expected to include some additional volume.

Just what the new export figure would be wasn't known as *The Digest* went to press, but the increase wasn't expected to be great.

Supply of oilseed meals in this country is still a little tight in spite of the big oilseed crops and some increase in crushing capacity.

Latest figures on meal production—for November—show an increase in output of nearly 50,000 tons over the year previous, or about 10 percent more than the same month in 1947.

Two hundred and twenty-five long tons of oilseed meals were allocated for export during the October-December, 1948, period. It's known some of this was never picked up, but the exact amount of the holdover wasn't known by end of the year.

Export demand for oilseed meals is still high. However, export dollars are short, coming mostly from ECA and the Army. This, plus the heavier winter use of meals in this country, has held exports down so far.

Officials still figure on a meal surplus this year of around 700,000 tons. This is a "statistical" surplus. It excludes soy flour, and any oilseeds going directly into export without processing.

It's based on some increase in animal units, and assumes the same rate of feeding as last year, which was a record.

The actual surplus may be larger or smaller, depending on the rate of feeding and the weather this winter and spring. In any case, it won't begin to be felt much in the markets until the second quarter of 1949—April-June.

Price Program Announcement of the 1949 soybean acreage goal and price support program is due this month.

While it isn't final, the 1949 support rate is pretty apt to remain at the present level —90 percent of parity.

This is being strongly recommended to Secretary of Agriculture Brannan by top officials in USDA, including Commodity Credit Corporation.

It's in line with recommendations on long time price supports made to Brannan by state PMA officials at the December conference in St. Louis.

The PMA committeemen asked that "basic" crops be supported at not less than 90 percent of parity. They urged the same price guarantees on other commodities (especially storables) on which growers were willing to carry out "satisfactory" production and marketing programs to avoid excessive market surpluses.

If this policy were adopted, it would put soybeans in about the same class as a basic crop, such as corn.

Congress is pretty sure to continue 90 percent of parity price supports for at least the basic crops. Sentiment for this has been building up ever since the election.

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Soybean Allocations Over 2½ million bushels more soybeans have been allocated for export during the first quarter of this year.

The January-March allocation—of 2,639,000 bushels—brings the total for export so far this season to 10.8 million bushels.

The new allocation represents 25.1 million pounds of oil. Three-fifths of the total are to be procured by PMA. The remainder is for commercial procurement.

In terms of oil, 15,086,000 pounds of the soybean allocation are destined for the occupation zones of Germany and Japan, and 9,975,000 pounds for France.

Included in the oilseed allocations were 169,314,000 pounds of shelled peanuts, and 400,000 pounds of cottonseed.

The first quarter fats and oils allocation amounted to 161.9 million pounds. Here is the breakdown in millions of pounds fat content:

Lard 72.5, margarine 2.1, shortening and other edible oils 21.3, linseed oil 3.5, other industrial fats and oils 50.6, soap 11.9.

"Basic" Question It's doubtful that the question of admitting new crops to the "basic" classification as far as legal definition is concerned will be opened up. Too many commodity groups might want to come in.

It is more likely that the Administration would put it up to the growers themselves. That is, offer them the same price guarantees as given the basic crops, if they are willing to meet certain conditions on production and marketing controls.

Market Street

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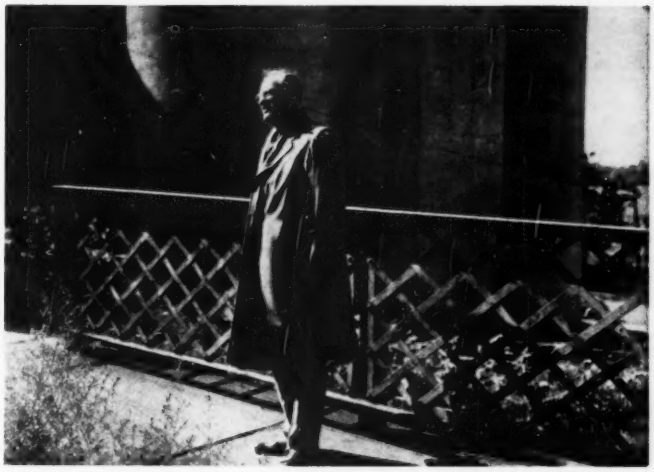

—Soybean Digest photo

This is Irving J. Rosen, president of Quincy Soybean Products Co., standing on the Mississippi River Bridge at Quincy, Ill., with plant in background. Office is on Front Street facing the river. Rosen believes there is still a future for expeller equipment in soybean processing. The plant houses six expellers with a daily capacity of 100 tons, and there is storage capacity for 600,000 bushels of soybeans. Rosen has operated the mill at Quincy since 1938. Prior to that he was in the grain and milling business at Madison, Wis.

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SOYBEANS PROMOTED BY GERMAN ASSOCIATION

By
DR. WOLFGANG Von SCHUH
U. S. Zone, Germany

For decades Germany has made trials with cultivation of soybeans. Our own seedstocks were developed. During the years 1920 to 1936 a number of breeders produced soybean seed, in 1936 about 4,000 bushels. Seeds of several varieties were available, adapted for different regions.

Then soybean development in Germany was interupted because the Germany government moved cultivation to the Balkan states—to Hungary, Bulgaria and Rumania in 1936. German cultivation went backward, and by the second world war many seed farms were destroyed.

Now the German Soybean Association is building up soybean cultivation in Germany again. During the past year many tests of cultivation have been made that indicate that soybeans can prosper in many areas of northern and southern Germany. The year 1948 has shown the first real progress in introduction of this important crop into the Middle European area. For the first time many farmers and gardeners have participated in the development. About 300 acres were planted in the western zones, and 250 acres in eastern Germany, occupied by the Soviets.

I know that is not much in all, but it is only a beginning. Besides the old plantings, in Bavaria alone nearly 100 acres were cultivated for multiplying seedstocks this past year. Next year soybean growing will be expanded to the limit of the seed available.

Southern Germany has many places well adapted for soybean cultivation and the climatic conditions are more favorable than was supposed. The farmers wish to plant this oilseed. The Military Government of Germany is assisting the work for furthering the production of protein and fat, both of which are urgently needed for nourishment.

This past year the German Soybean Association has carried out comparative cultivations in Frankonia of 110 varieties and strains of soybeans from different countries. The American Soybean Association gave us a collection of samples from different regions of the U. S. A.

On a tour of some days in the middle of September members of the American Military Government visited farms growing soybeans in different regions. They saw that the soybean will prosper very well under the climatic conditions of Germany in spite of the unfavorable weather of the past year, which was cold and very moist in the summer months. Kenneth W. Ingwalson, director of the food, agriculture and forestry division in the Military Government for Bavaria, who comes from Minnesota, is much interested in the tests and in furthering the efforts of the German Soybean Association.

As chairman of this Association I had the honor of conducting this tour and I am in close touch with the U. S. offices. We have to thank officers in the U. S. Military Government who have the greatest understanding of our needs and assist our work in every possible way.

The American Soybean Association may be assured of our heartiest thankfulness for its kind help and good intentions.

—s b d—

JAPAN IMPORTS SOYS

A $60-million-dollar trade agreement between Siam and Japan that includes Japanese purchase of soybeans from Siam has been announced by General Douglas MacArthur, according to Associated Press.

The first order calls for about 7 million dollars of railroad rolling stock to be exported by Japan in return for much-needed imports including soybeans from Siam.

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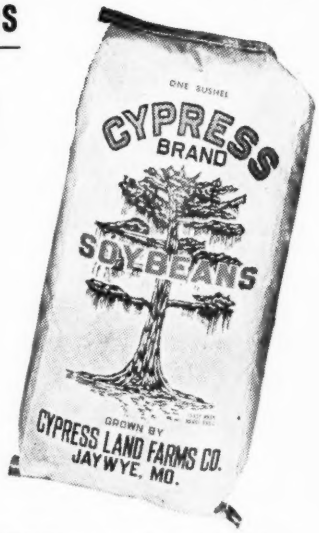

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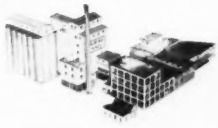

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In The MARKETS

ALL DECEMBER MARKETS LOSE SOME GROUND

Soybean, meal and oil markets all took a beating in December, but soybean futures strengthened the last 10 days of the month.

A sharp break in soybean futures the week end of Dec. 11, when bean prices dropped the 10-cent limit 2 days, affected both meal and oil as well as grains in general. Meal was forced to lower levels, due also to light customer demand.

The vegetable oil market was also weakened by the prospect of a big supply of fats and oils for the coming year. The output promises to be the largest in peacetime history and close to the record production of 1943-44. The U. S. produced three record oilseed crops in 1948—soybeans, flaxseed and peanuts—and a huge cottonseed crop.

But the month's price spread was relatively narrow, being less than 2c for cash crude soybean oil.

The markets were in usual holiday doldrums the latter part of December.

Reasons given for the slump in soybean prices:

1—The announcement of Commodity Credit Corporation's domestic sales policy for 1949 which was interpreted as weakening the government's position on support prices. This was probably what touched off the drop.

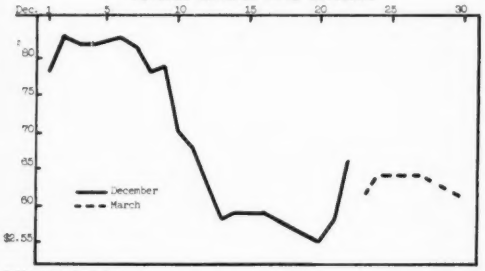
2—The U. S. Department of Agriculture crop report raising the government's estimate of the 1948 soybean crop 10 million bushels, to 220 million bushels.

3—The easier fats and oils market.

A small government allocation of soybeans for January-March shipment abroad failed to add much strength to the market. Chicago receipts for the month were moderate with buying interest light. But soybeans in storage were still apparently in strong hands and there was little tendency to dump them.

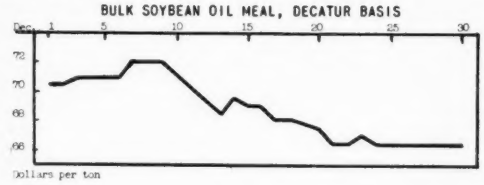
Production of soybean oil meal was at capacity in December.

FUTURES CHICAGO NO.2 SOYBEANS



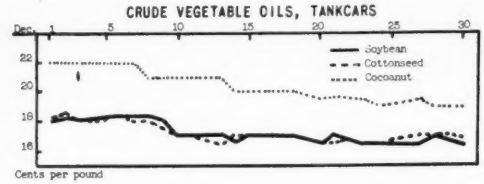
Dollars per bushel

BULK SOYBEAN OIL MEAL, DECATUR BASIS



Dollars per ton

CRUDE VEGETABLE OILS, TANKCARS



Cents per pound

Most processors were sold through March and offerings were light.

The fact that the Army was in the market for purchase of 55 million tons of soybean oil meal for foreign shipment made for a stronger tone but failed to prevent the decline. But meal was at times a shade stronger during the last week.

Spot crude soybean oil sold at the lowest levels since Mid-October. Trading was light most of the month.

The December No. 2 soybeans opened at $2.78 for the month, and closed at $2.62. There was a spread of 27c between the high price of $2.83 Dec. 2-6 and the low of $2.55 Dec. 21.

Bulk soybean oil meal Decatur basis opened at $70.50 for the month, reaching a high of $72 Dec. 7-9, and closing at $66.50, the month's low. Spread between the high and low prices for December was only $5.50.

Crude soybean oil in tankcars opened at 18c and closed at 16¼c, the month's low. High was 18⅛c Dec. 6-8.

NEW YORK SOYBEAN OIL FUTURES DEC. 31*

Close: Jan., 17.50B; Mar. and May, 17.25B; July and Sept., 16.75B; Oct. and Dec., 15.00B.

No sales. B—bid.

MEMPHIS FUTURES CLOSINGS DEC. 31*

Soybean Meal: Jan., flat 67.50; March, flat 59.25; May, flat 58.00; July, flat 57.00. Sales: 2,800 tons.

*Reported by Chicago Journal of Commerce.

The Year's Markets

The soybean market was normal in at least one respect during 1948: prices at harvest time were lower than they were during the months preceding or following harvest. (See graph on the front cover.) This was the same trend as in most past years.

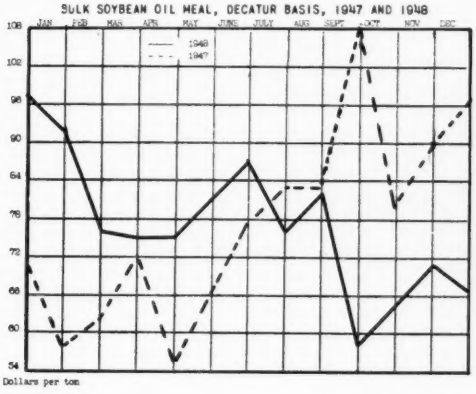
Pattern of the soybean and oil meal markets was quite similar throughout the year. Both maintained materially higher prices in 1948 than in the same months in 1947 through July, when the effect of the impending record crop was felt and prices slid below 1947.

New crop soybeans went on the market at more than a dollar under what beans brought a year earlier. Out in the country some soybeans sold under government support levels.

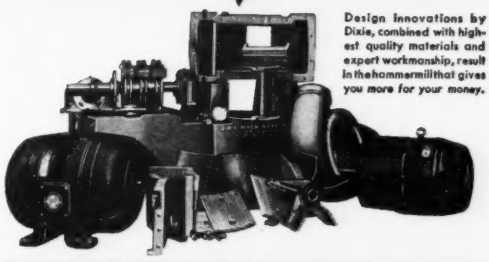
The soybean oil market followed a somewhat different pattern, being under 1947 prices the first 4 months, then above 1947 until late September, when again it dipped below year earlier prices. Vegetable oil prices in general have been declining since June due to increasing supplies in this country.

Soybean futures reached the all-time high of $4.41 on the Chicago board of trade January 17. But early in February beans, oil meal and oil all followed the break in the grain market, the heaviest since 1917. March soybean futures lost $1.14 and bulk soybean oil meal lost $33 during the month.

After the February break bean and meal markets began a gen-



HERE'S WHERE SAVINGS BEGIN!



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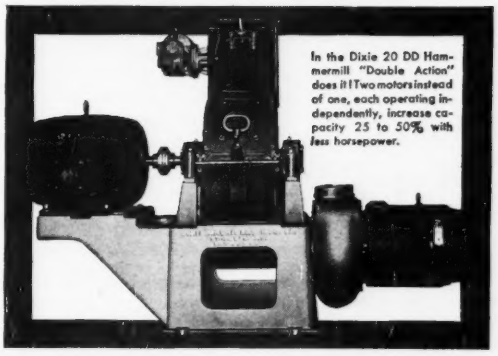

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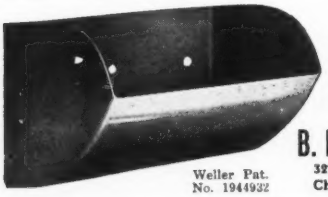

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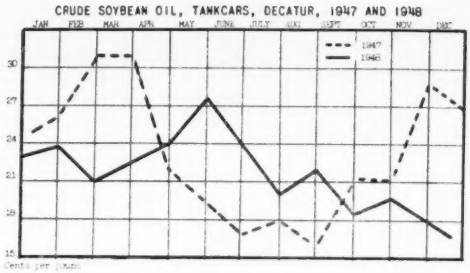

eral upward climb lasting through June. By that time most of the old crop supplies were cleaned out. Strong strengthening influences were the Marshall plan which went into high gear last spring and opened up export markets, and Army buying of meal and oil.

All markets broke again following publication of the government's July and August forecasts of bumper crops. There was a strong readjustment downward between old and new crops.

Factors in the bean and meal markets during the fall were the government's price support program and announcements of allocations of beans and meal for shipment abroad; and the fact that growers held far more beans off the market than in past years.

Industrial users purchased soybean oil in larger quantities in 1948 than in the past.

● FACTORY USE SOYBEAN OIL. Factory consumption of crude soybean oil during the third quarter of 1948 totaled 313,694,000 lbs., according to Bureau of the Census. Of this amount, 303,303,000 lbs. were used in refining.

Nonrefined consumption during the third quarter by uses and totals: fat splitting (hydrolysis) 254,000 lbs.; sulphonation 132,000 lbs.; soap 420,000 lbs.; paint and varnish 3,523,000 lbs.; printing inks 1,000 lbs.; lubricants and greases 149,000 lbs.; other 5,912,000 lbs.

Factory consumption of refined soybean oil during the third quarter totaled 300,888,000 lbs., in the following fields: fat splitting 58,000 lbs.; sulphonation 208,000 lbs.; winterizing for salad oil 28,218,000 lbs.; shortening 155,801,000 lbs.; margarine 69,200 lbs.; other edible products 12,276,000 lbs.; soap 227,000 lbs.; paint and varnish 20,502,000 lbs.; linoleum and oilcloth 5,265,000 lbs.; printing inks 36,000 lbs.; lubricants and greases 40,000 lbs.; other inedible products 9,057,000 lbs.

Factory production of crude soybean oil in October totaled 136,864,000 lbs. compared with 104,230,000 lbs. in September. Production of refined soybean oil in October was 91,632,000 lbs. compared with 72,915,000 lbs. in September.

Factory consumption of crude soybean oil in October totaled 100,979,000 lbs.: of the refined soybean oil, 95,915,000 lbs.

Factory and warehouse stocks Oct. 31 totaled: crude, 62,351,000 lbs.: refined, 48,725,000 lbs. This compared with Sept. 30 stocks of 44,921,000 lbs. of crude oil: and 51,294,000 lbs. refined oil.

● SOYBEAN INSPECTIONS. Inspected receipts of soybeans dropped sharply in November to a total of 15,841 cars compared with 35,861 cars in October, according to reports to the Department of Agriculture. November inspections brought the total for the first 2 months of the current season to 51,702 cars compared with 43,115 cars for the same period last year. The average for the month of November for the crop years 1942-46 was 17,218 cars.

The quality of the soybeans inspected in November was lower than for the preceding month, only 68 percent grading No. 2 or better compared with 78 percent in October. October-November receipts graded considerably below those of last season, largely because of high moisture, only 74 percent grading No. 2 or better compared with 89 percent a year ago.

Inspections of soybeans in November included the equivalent of 334 cars inspected as cargo lots and truck receipts equal to about 292 cars.

• LOANS AND PURCHASE AGREEMENTS. The Production and Marketing Administration of the U. S. Department of Agriculture announced that 4,507,829 bushels of 1948-crop soybeans and 1,067,272 bushels of 1948-crop flaxseed were placed under Commodity Credit Corporation price support loans through November 30. Price support purchase agreements as of that date covered 362,051 bushels of soybeans and 996,784 bushels of flaxseed. Final date for obtaining loans and purchase agreements on 1948 crop soybeans and flaxseed was December 31.

The following table shows the distribution of loans and purchase agreements by states through November 30, as well as the breakdown of loan commodities into warehouse and farm storage loans:

1948 SOYBEANS UNDER PRICE SUPPORT PROGRAM

State	Under Loan Warehouse (Bushels)	Farm	Total	Under Purchase Agreement
Arkansas				3,000
Illinois	238,625	208,893	447,518	188,585
Indiana	12,615	84,045	96,660	15,031
Iowa	2,065,950	826,632	2,892,582	106,676
Kansas		11,466	11,466	1,250
Minnesota	388,976	184,537	573,513	40,473
Missouri	324,652	82,079	406,731	
Nebraska	5,778	3,086	8,864	
North Dakota	4,234	6,384	10,618	450
Ohio	13,961	28,336	42,297	1,698
South Dakota	2,479	15,101	17,580	4,888
U. S.	3,057,270	1,450,559	4,507,829	362,051

• COMMERCIAL GRAIN STOCK REPORTS. Production and Marketing Administration's commercial grain stock reports for Nov. 29-Dec. 27.

(1,000 bu.)

	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27
Atlantic coast	635	895	951	1,134	1,376
Gulf coast	630	214	467	198	214
Northwestern and Upper Lake	1,173	1,143	1,105	1,021	1,032
Lower Lake	5,355	5,411	6,318	6,479	6,370
East Central	4,470	4,351	4,284	3,697	4,009
West Central Southwestern & Western	2,799	2,821	2,810	2,732	2,659
Total current week	15,062	14,835	15,935	15,261	15,660
Total year ago	14,654	14,846	14,667	14,770	13,659

U. S. BONDED GRAIN IN STORE AND AFLOAT AT CANADIAN MARKETS

Total current week	2	2	2		2

• STANDARD SHORTENING SHIPMENTS. Reported by members of Institute of Shortening and Edible Oils, Inc., in pounds.

Week ending December 4	5,982,034
Week ending December 11	5,592,185
Week ending December 18	4,685,006
Week ending December 25	3,834,699

Grand total of shortening and edible oil shipments for the first three quarters of 1948 as reported to the Institute of Shortening and Edible Oils, Inc., was 2,100,828,000 lbs.

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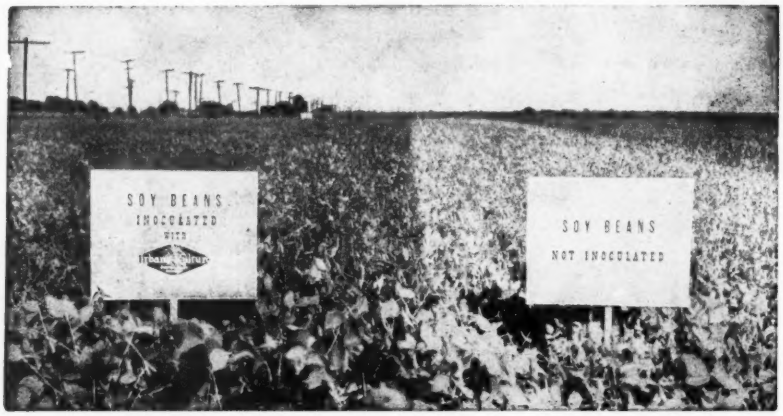

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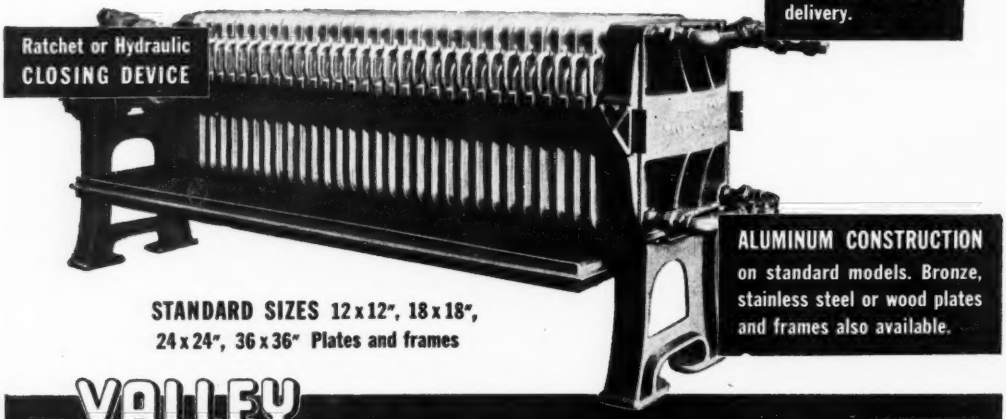

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LETTERS

STANDSTILL IN PACIFIC

To the Editor:

I am greatly interested in the growing of soybeans.

Your Consul gave me a few names to write to for information about the bean. I can assure that any information I obtain will be greatly appreciated by me. I was for many years living in the Solomons growing copra. When the Jap turned up I joined the U. S. Naval Forces and left them after the landing at Leyte in the P. I.

The Solomons are at a standstill due to the fact that the natives are not willing to sign on again. Most of the plantations have gone to growth through neglect during the war years and the cost is too great to start to clear them again with indifferent labor, so I am beginning again in Australia to grow the soybean.

Please let me be a subscriber to the *Soybean Digest*. Will you give me any information you have available on this subject. I feel that I am not a stranger in writing to you people as I had so long a time with your boys in the various campaigns, and what a great crowd of boys they were, too.

I wrote an article on the soybean which appears in next month's issue of the *Food Manufacture*, a journal published in this state on general items of food interest. It is a pity that you could not get one of your members to put on a soybean exhibit of many of the products made in the States from the bean, that would enlighten the people here as to its usefulness.—*Robert Bruce, Melbourne, Australia.*

SAYS CAN'T GET MARKETS

To the Editor:

Just received the December issue and read about the Adams soybean. Since there is no seed available this year, I will probably stay with some other variety.

Inasmuch as my Lincoln seed is not fit for seed this year I have been interested in the Hawkeye but the price is not in keeping with my good neighbor policy . . . A man at Macon, Mo., wants only $12 for seed not certified!

I have a variety of my own selection that has outyielded the Lincoln for 4 years straight. They are a very branchy fine-stemmed bean and I had in mind to feature them as a combination hay and grain bean. They do not stand up as good as they should. This year they went plumb flat but in spite of that they beat the Lincoln by 2 bushels per acre.

That slump in the market had me guessing. Feel easier now.

Wish to inform you that I tried my best to get our St. Joseph newspaper to publish the daily cash market but of no avail . . . The only way I can find out is through inquiry myself or have somebody do it for me. —*E. W. Trachsel, Helena, Mo.*

The Old-Timers

To the Editor:

I was more than usually interested in the November issue of the *Soybean Digest*. I have known the Fairchild family since I was a small boy and met David Fairchild a few years ago at the time of his receiving an honorary doctor's degree from Kansas State College. His account of early work with soybeans was most interesting.

The list of "old timers" in the soybean industry was also interesting. Since you ask for corrections, I would call your attention to R. P. Cocke at Williamsburg, Va., and not Cooke as you have it. My first soybeans were grown at Williamsburg, Va., where Cocke was both superintendent of the Station and a farmer-neighbor of mine. Borst and J. B. Park have not retired. Borst is at the Ohio Agricultural Experiment Station at Wooster in the employ of the Soil Conservation Service. Park is still with this department. F. A. Welton at Wooster retired July 1 of this year. —*C. J. Willard, professor of agronomy, Ohio State University, Columbus, Ohio.*

Name for "Little Guy"

To the Editor:

On page 13 of the Dec. "Digest" is an invitation to help name the little man in the cartoon. We suggest the name "Sydney Soya" with Syd for short.—*W. B. French & Sons, Wakeman, Ohio.*

See the little man on page 6.—Editor.

Take Kaleidoscopes — Or Commodities

They've got a lot in common.

Kaleidoscopes whirl mixed bits of stone, glass, and paper . . . use mirrors to reflect them as beautiful, symmetrical patterns.

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BUTTER ORGAN URGES CHANGE IN TACTICS

American Butter and Cheese Review (November 1948): Who lately broached the proposition for removal of all federal and state taxes and license fees on manufacture and sale of margarine if its manufacture and sale colored yellow in semblance of butter is prohibited? We will tell you, it was the American Butter Institute, the National Creameries Association and the National Cooperative Milk Producers Federation!

And soundly done,—but probably if not unquestionably too late.

Reaction is clearly shown in the reception of this proposal by the National Association of Margarine Manufacturers, who—with bit in teeth—are increasingly aggressive. And why not? They hold all the cards in this hand of the game played before the public.

Paul T. Truitt, margarine manufacturers' association president, was on the button to laugh off (in widely publicized comments) the butter industry's conciliative move.

Said he in essence that, confident of the kicking out of the federal anti-margarine legislation by the next Congress, he ridiculed the claim of butter to a monopoly on the color yellow, and highlighted the fact that butter manufacturers have for years—without penalty—freely and largely, during certain seasons, used an artificial coloring to make their product resemble its flush-season natural state. Therefore, he claimed, margarine makers should likewise be permitted to color their output to any shade provenly attractive to the consumer.

The argument could go on for years, with some right and logic on both sides. But this time it won't! Every observer of the Washington scene is convinced that federal regulatory legislation on margarine will shortly be thrown overboard—very probably without any complementary ban on its yellow coloration by the maker.

Again may we ask a question? Instead of fumbling around on the eventually losing side in a battle which to us seems as outmoded as an engagement in the War of 1812, why not all of us in the dairy field get together behind the American Dairy Association, the National Dairy Council, and others, to give them funds and support to sell butter—the best edible fat of all—against any competition!

After all, if the vast dairy industry—by far the country's largest agricultural activity—continues to choose to spend less on consumer education and product publicity than the walnut and raisin growers, whose fault is it if per capita butter consumption holds down to 12 to 13 pounds per year?

The heck with oleo; let's sell butter on its proven merits!

THE PRESS

ARE FEEDERS TOO CLEAN?

Kent Trade-Trends: Feed specialists don't know all about feed yet. There is a growth factor in animal proteins that has them puzzled. R. M. Bethke, of the Ohio experiment station, in a recent address, says this unknown growth factor is just as important as the vitamins.

Bethke says that this unknown growth factor exists in animal proteins and in the rumen of a cow. It is also found in manure.

Poultry experiments at the Ohio station have shown that deep litter is better than are frequent changes of litter. Bethke hints that the chickens may have picked up this growth factor from their own manure.

"Maybe we can be too clean sometimes," Bethke suggests.

Mixed proteins (animal and vegetable) and milk products are sources of the unknown growth factor which farmers can use while nutritionists find out more about what it is.

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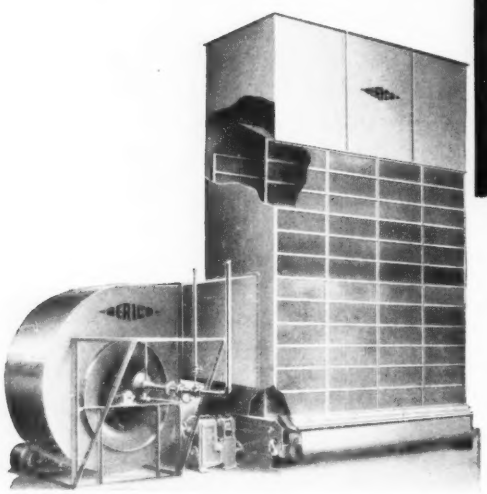
LOW TEMPERATURE DRYING IS NOW AVAILABLE FOR SOYBEANS

Pre-eminent in the field of rice drying, from Louisiana to California, and winning acclaim for their efficient drying of Corn, Wheat, Flax, Peanuts and other cereals, **BERICO Columnar Grain Driers** are ideally suited to the removal of moisture from Soybeans, **without the hazards of high heat.**



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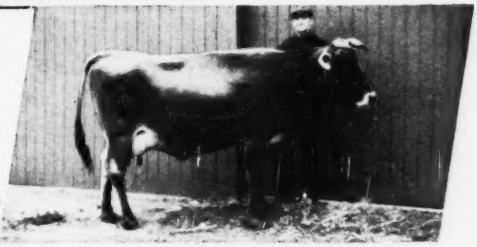
Yes—year after year the Wayne Way *pays.* Local, state, regional and national records prove it. *Your own success and profits*—in feed-lot or showring—will prove it. So feed as nearly a million farmers do. Start today on the Wayne Way with your poultry and livestock, and cash in with results such as reported here.

$4.41 PROFIT PER BIRD—H. A. Cannon, LeMars, Iowa, following the Wayne Way exclusively for the past 6 years, reports his flock averaged 237.7 eggs and $4.41 profit over feed cost in 1947.

You, too, can feed for profit-results like these:

WORLD'S RECORD-MAKING MILK PRODUCTION—Royal Muffin, 5 year old Brown Swiss, made 18,845 lbs. milk and 741.5 lbs. fat in 305 days on 3X milking. Says owner Reinhard Geredes, Princeton, Ill.: "She made this record on Wayne. My 14 cows averaged 507.7 lbs. fat and 12,532 lbs. milk last year on D.H.I.A. I've fed Wayne Dairy Feeds 14 years!"



222 LB. HOGS IN 5 MO., 2 DAYS—Jay Wood, Columbia City, Ind., marketed 44 Wayne-fed hogs averaging 222 lbs. in 5 months, 2 days . . . required only 6 bu. grain, 39 lbs. Wayne Hog Supplement to produce 100 lbs. pork. Hogs fed grain alone usually require about 12 bu. Small wonder he wears that corn-saving, profit-making Wayne smile!

FIRST PLACE SHORTHORN STEER

in the Yearling Class at the 1947 International Junior Livestock Show was "Tubby," shown by Donald Moody, Lovington, Ill., who says, "I started 'Tubby' on full feed Dec. 1, and he was never off once. Wayne Sweet Mix is highly appetizing—puts on a quality finish. Dad and I follow the Wayne Way with all our livestock."

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